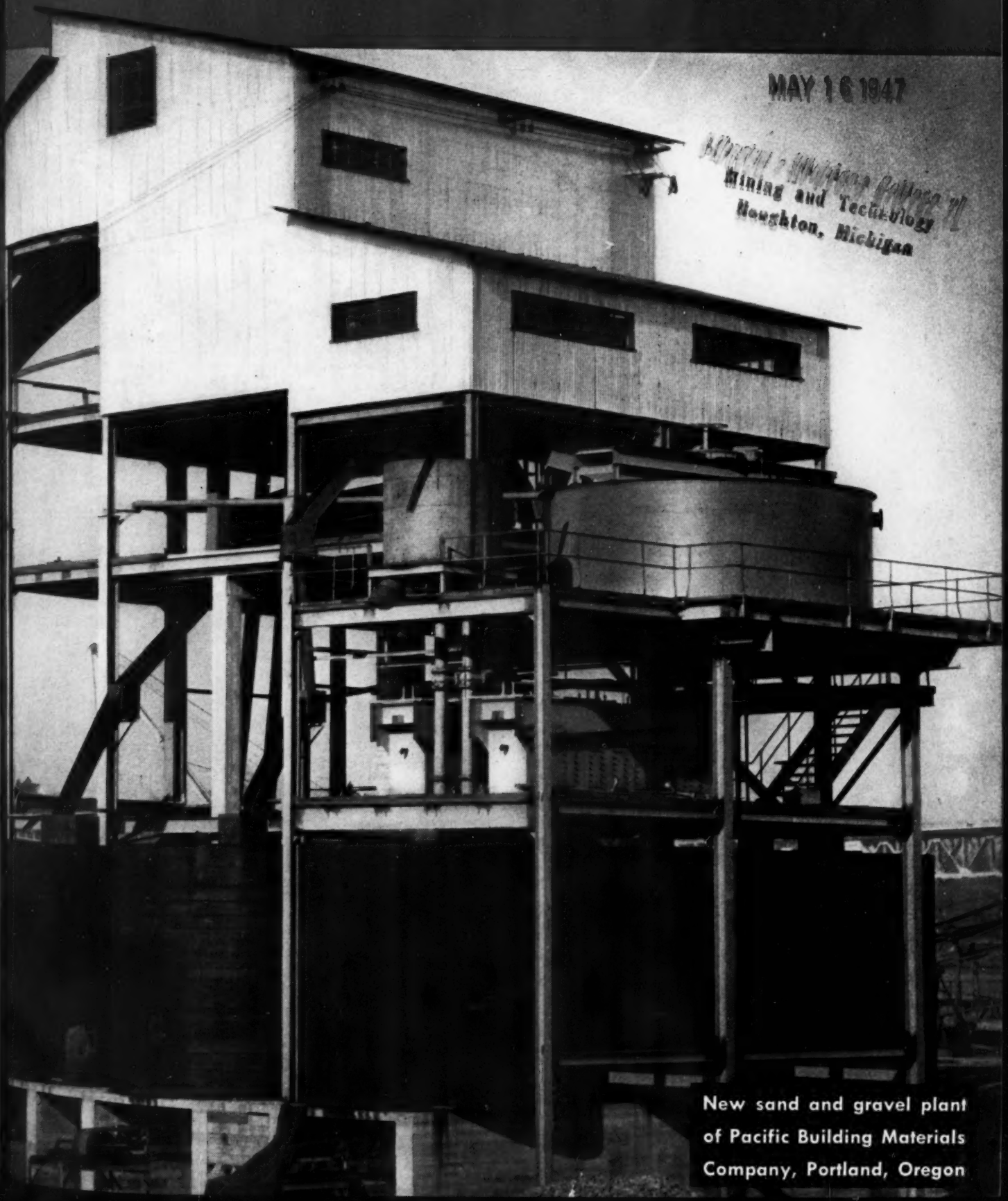
MAY 1947

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY



New sand and gravel plant of Pacific Building Materials Company, Portland, Oregon

THE WILLIAMS "NF"

for AGRICULTURAL LIMESTONE

TAKES 4-INCH FEED OR SMALLER

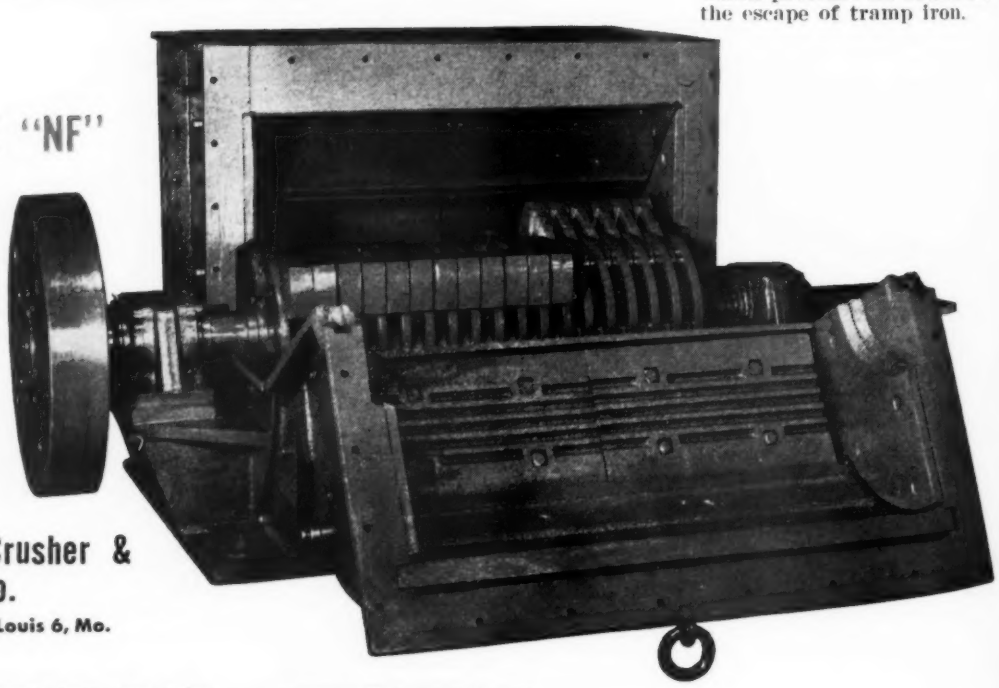
The Williams "NF" Hammer Crusher is the outstanding machine in its field for reducing 4" rock to ¾", ½" or agricultural limestone. The fact that Williams has pioneered the hammer mill and has been foremost in its developments speaks for itself. No attempt has been made to build the "NF" cheap in first cost, instead special care has been given to dependability and final cost.

The "NF" is built in a large range of sizes with capacities from 3 to 75 tons per hour, affording a size mill for any job.

Sectional view of Williams "NF" type hammer mill, with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.

FEATURES OF THE "NF"

- Adjustable Grinding Plate
- Hammers Adjustable to Overcome Wear
- Larger Capacities
- Lifetime Construction
- 2" Top Liners, 1" Side Liners
- Easy to Work On—Hinged Cover



The Williams Patent Crusher & Pulverizer Co.

800 St. Louis Ave.—St. Louis 6, Mo.

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

Williams

PATENT CRUSHERS GRINDERS SHREDDERS

Open view of the Williams "NF" mill showing heavy duty hammers, grinding plates, side liners and cover liners. Also shows easy accessibility to mill for repairs, etc.

"WE HEAR..."

May 1, 1947

Expenditures for new highway construction may reach a total of $1,200,000,000 in 1947, according to State highway department estimates, which would be a new high for highway history.

* * * * * * * * * * *

Rock dusting in the Centralia Coal Co. (Ill.) mine where 111 miners lost their lives recently would have prevented the spread of the explosion, according to some investigating officials who estimate that the explosion would have been minor if $1000 had been spent for a rock dusting machine and $1000 on limestone dust. A proportion of limestone dust to coal dust of two to one will localize mine explosions.

* * * * * * * * * * *

Gypsum is one of the most versatile materials of all, with some 900 uses in construction.

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Trends in NLRB decisions and opinions are switching around more favorably to employers. Now the Board provides that unions, as well as employers, must show good faith in their bargaining, whereas it used to be that the employer, not the union, was blamed for a breakdown in negotiations because of bad faith. It has been found that unions must bargain in good faith in order that it can be determined whether an employer has failed to bargain in good faith.

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Silicone varnish and grease, manufactured by Dow Corning Corp., are being used for the first time as standard insulating and lubricating materials for electric industrial truck motors, by Automatic Transportation Co.

* * * * * * * * * * *

The peak in construction costs has been reached in the opinion of 53 per cent of the country's general contractors, says F. W. Dodge. Throughout the East, that opinion was preponderant according to the survey while, in the far West, builders expect costs to rise another 11 per cent or 12 per cent in 1947.

* * * * * * * * * * *

A long-range program for the development of the water and power resources of the Pacific Northwest, involving spending $5,600,000,000 over a period of years, has been approved by the Bureau of Reclamation. There are 238 projects involved, falling within the jurisdiction of seven States, and the dollars figure is based on the high costs prevailing in 1946.

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California has a $2,800,000,000 highway program up for consideration to initiate a state expressway system of 3,238 miles, of which 3170 miles are in the present highway system.

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A fuel scarcity next Winter, at least for homeowners, is being predicted because of the export of coal to Europe and the continued shortage of other fuels.

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During the war, the German glass industry operated without borax, boric acid and lead oxide, items which have been considered essential in making heat-resistant glass. The formulae provided for high lime content and little or no soda ash, lime being considered as producing a eutectic and rate of viscosity similar to that resulting from use of boric acid.

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(Continued on page 50)

WE HEAR

Lime manufacturers may take encouragement from a recent announcement by the Norfolk and Western railway that construction of 100 new, all-steel 70-ton covered hopper cars will begin this Summer. The railroad considers the expansion necessary due to the increase in production of lime within its territory.

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Texas has become the twelfth State to outlaw the closed shop. In signing the bill, Texas' governor like others stated that it (the bill) would not remove the right of collective bargaining or destroy union labor.

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Construction limitations for farmers are being raised, which should interest producers of concrete, concrete products and raw materials for concrete. Nonresidential structures on farms of five acres or larger may be built, changed or repaired without CPA approval to the upper limit of $5000. The former limit of $1000 still holds for smaller farms.

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Cost of living since August, 1939, has been increased by 56 per cent due to price rises, with the result that the average weekly pay checks of about $46 for factory workers will buy what $29 bought prewar.

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High costs are slowing commercial and industrial construction, and increasing numbers of building projects are being shelved in the face of the fact that building costs have risen 20 per cent over 1946 levels. Whereas companies in need of new building rushed a year ago to beat rises in building costs, they now assume that peak costs have been reached and await anticipated price recessions in the neighborhood of 10 per cent to 15 per cent by year-end.

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Some 40 self-unloading vessels in the 1947 bulk freighter fleet on the Great Lakes will be employed in shuttling limestone from upper lake ports to the steel mills.

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A survey by the federal government reveals that the cement shortage is vanishing rapidly and that the supply in the hands of manufacturers is building up for the first time since last year. Concrete block also have been found in more plentiful supply, with an output now some four times the 1944 level.

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According to Dodge, contracts awarded for residential construction in the 37 States east of the Rocky Mountains totalled $465,810,000 during January and February. This compares with $191,794,000 for the same period in 1946.

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A study by the North Carolina Highway Commission sheds light on the degree of cost increases for construction. The Commission paid over 100 per cent more in 1946 than in 1940 on many unit jobs. For example, 148 per cent more was paid in 1946 to clear an acre of trees than in 1940 and 92 per cent more for placing concrete in bridge construction.

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Total value of minerals and mineral products produced in the United States and Alaska in 1946 reached an all-time peak. The total value of close to nine billion dollars exceeded the former record of 1944 by six per cent.

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It is anticipated that farm payments for soil conservation, now under critical examination, will continue to be threatened as long as farm incomes continue at high levels, notwithstanding the serious consequences that would follow a slackening of soil improvement practices.

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Construction or improvement of 800 airports is provided for in the 1947 federal-aid airport program of the Civil Aeronautics Administration. Cost of the program will exceed $71,000,000 of which $34,000,000 will be provided by federal-aid funds.

THE EDITORS

★ ★ Editor's Page

Construction Costs Under the Microscope

EXCESSIVE CONSTRUCTION COSTS are rapidly stiffening consumer resistance; and the reported curtailment of some building plans is unassailable evidence that price adjustments must necessarily come, before inevitable prosperous times immediately ahead for the construction industries can be attained. Orderly price adjustments, could well discount predictions that a mild recession will accompany the adjustment period, at any rate for the building industry.

Big distortions now existent in prices for some materials and services related to construction, if not corrected soon, will lead to the building industry pricing itself temporarily out of the market just as it did following Word War I. Those distortions are accumulative, in total cost of a construction project, and the assumption is that all construction items carry exorbitant price tags.

BROYHILL HOMES
COST INCREASES SINCE 1941

	MAR., '41	MAR., '47
Original Land Cost	$ 1,650.00	$ 3,500.00
Architect-Plans	25.00	80.00
Permits	9.20	18.45
Engineer Survey	10.00	20.00
Insurance, Appraisal, Title, Recording Fees, Premiums & Interest	150.00	300.00
Clearing Site	36.00	72.00
Staking Out	25.00	50.00
Main Excavation	31.85	75.00
Concrete-Material	211.00	321.07
Concrete-Labor	130.50	260.00
Drain Tile-Gravel	32.00	58.50
Brickwork-Material	1,386.00	2,100.00
Brickwork-Labor	822.50	1,400.00
Waterproofing	55.25	100.00
Damp Proofing	36.10	74.00
Steel	154.60	196.50
Basement Windows, Screens	98.50	144.90
Lumber	520.60	905.82
Millwork	910.00	1,750.00
Carpentry Labor	762.50	1,762.00
Roofing (Slate)	410.00	630.00
Gutters, Downspouts & Flashing (Copper)	107.50	162.00
Hardwood Floors	220.50	475.00
Linoleum	41.00	60.00
Asphalt Tile	160.00	210.00
Tile	340.00	695.00
Plastering	550.00	1,125.00
Rough Hardware	25.60	49.64
Finish Hardware	78.50	168.00
Medicine Cabinets	27.50	43.12
Heating	510.00	1,100.00
Plumbing	892.50	1,800.60
Electric Fixtures	54.00	162.37
Electric Work	150.60	392.50
Painting, Papering	350.00	650.00
Caulking	17.50	35.00
Insulation	60.00	100.00
Kitchen Cabinets	180.00	293.77
Range	150.00	225.00
Refrigeration	128.50	210.00
Weatherstripping	45.99	72.30
Glazing, Basement Windows	12.00	27.90
Door, Window Screens	83.00	176.00
Other Screening	40.00	83.50
Venetian Blinds	115.00	182.20
Driveway, Grading	75.00	153.00
Sod & Shrubbery	168.50	397.00
Cleanup	40.00	75.00
Water Tap	40.00	40.00
Supervision and Overhead	200.00	400.00
Miscellaneous	120.00	300.00
CONSTRUCTION COST	$12,306.79	$23,676.65
Gross Profit	1,193.21	2,323.35
TOTAL COST	$13,500.00	$26,000.00
Percent of Increase		92.6%

One notable exception is the rock products industry, which need feel no responsibility for present inflated construction costs. Intense competition prevails in the industry as reflected by price trends for aggregates, portland cement, ready-mixed concrete and other products of the industry. Price gains for these materials cannot be bracketed with those for other construction materials, in any consideration of inflated prices, and are factual proof that this industry need never have been subjected to price controls.

Examination of the tabular data shown herewith will establish the principal offenders in the price spiral. The figures, from actual job-cost estimate sheets, reveal startling contrasts in cost items, comparing March, 1941 costs with those of March, 1947 for two almost identical six room homes built by M. T. and Joel Broyhill, builders, at Arlington, Va. The data, taken from the Real Estate Section, March 23, of *The Washington Post*, and a supporting article, were reprinted and apparently distributed widely to publicize the reasons why prices of homes are so high.

Here is an opportunity for direct cost comparison, prewar and postwar, which reveals that labor is exacting an enormous price, directly and indirectly, for its services. While aggregates and portland cement represent only 1.4 per cent of the total cost of the homes compared, the figures pricewise are favorable and can be considered as typical for comparing costs nationally.

The cost of concrete materials, to the Arlington builders, had increased 52 per cent in six years, whereas the labor for mixing and placing the concrete had risen 100 per cent. Brickwork materials cost 52 per cent more, but the attendant labor jumped 125 per cent with an increase in rate of pay from $1.12½ to $2.37½ per hour. Carpentry labor, plumbing and plastering costs had boomed to the tune of 131 per cent, 102 per cent and 105 per cent, respectively.

Increases in retail prices of aggregates and portland cement in the Arlington area, and over the country, actually were less than those commodities cost the builder as set forth in his job-estimates. Portland cement had increased only 14 per cent, for carload lots, in closeby Baltimore, Md., for the two years compared; gravel aggregates, 1½-in. and ¾-in., had risen 20 per cent in price to $2.10 per ton; crushed stone in the same sizes went up 14 per cent; and ready-mixed concrete (1:2:4) prices increased from $7.25 to $8.00 in units of 50 cu. yd. or more.

The accumulative pileup of labor costs upon labor costs, shortages and unproductivity of labor, delays which contribute to high cost of manufacture, etc., might be blamed for the high prices of fabricated building materials, but high level production and competition can achieve the comparative price levels that the rock products industry has been favoring the consumer with all along.

This industry too has been contending with high prices for everything, shortages and all the handicaps that have hampered business. It has had to absorb direct labor costs more than 40 per cent higher per unit of output than six years ago. Certainly there can be no better example than the rock products industry to prove the relation of competition to low prices and to show the reflection, in low unit cost, of high output.

Bror Nordberg

Macwhyte Wire Ropes include: MACWHYTE PREformed and Non-PREformed Internally Lubricated Wire Ropes . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Stainless Steel Wire Rope . . . Monel Metal Wire Rope . . . Galvanized Wire Rope. Macwhyte also makes Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods. Catalogs on request.

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By NATHAN C. ROCKWOOD

Humanitarianism by Legislation?

THE DEATH OF HENRY FORD provided a field day for radio commentators and editorial writers; and justifiably so, because by any measure he was a really great man and a practical, generous benefactor of his contemporary human beings. So far as we know he never was honored for advancing civilization as a highway builder, although the commissioner of highways of his Michigan home county was praised and honored without end as "the father" of concrete highways. The commissioner, and thousands of other highway officials like him, merely delivered what Henry Ford and his "common peoples' car" had created a unanimous demand for.

So, while others honor his memory as a great industrialist, we will pay our respects to his memory as a humanitarian and patron saint of a large part of the rock products industries. We know by personal experience of what we write, because once we were the proud owner of a Model T, and in it cruised from New York City to Buffalo, Cleveland, Cincinnati, Louisville, Nashville, Chattanooga, Atlanta, Asheville, Roanoke and back to New York, in 1917, before Henry Ford's customers had begun to get "good roads."

A Voluntary Humanitarian

The most popular theme in recent eulogies of Henry Ford appears to be based on a kind of self pity that Ford's time and opportunities have passed forever from the American scene—that "his death marks the end of an era." No longer can an individual or a business corporation build up such an immense organization by plowing back profits; for, now the federal, state and local governments take by far the largest slice of such profits. When Henry Ford first earned a million dollars a year, practically all of it was his to do with as he pleased. Today, if a man earns a million dollars a year the Federal Government alone takes all but about $160,000 of it, so he can never individually, or collectively with other millionaires, accumulate the means to do what Henry Ford did singlehanded.

What Ford did with his immense financial resources was far more than build an industrial empire. He devoted practically all of it to doing good in many practical ways, not the least of which, of course, was creating new employment opportunities, directly and indirectly, for literally millions of his fellow citizens. Just as important was what he did not do with his wealth. He did not build palatial homes, buy and operate private yachts, indulge in numerous wives, or flash his extraordinary income in other ways to arouse the envy, hatred and disgust of his fellow citizens. He remained throughout his life a sincere believer in the simple life.

His contributions to charitable, educational and praiseworthy objectives were probably far greater than ever will be known, because he made them for what he considered practical and logical reasons; and he wanted no fan fare or publicity about them. They were evidently given from a sense of duty that a man of genius feels that he owes to his country and its institutions for opportunities given him, not as a sop to the conscience of an old man about to die who finally comes to realize that he "can't take it with him."

The net result of his practical methods of using his wealth was something Henry Ford possibly did not contemplate (or, who knows? maybe did); that was, to convert the great mass of the American public to the belief that what he voluntarily did with his wealth, should be forced upon other leaders of industry by passing laws. For it was Ford who first advocated and proved by action and example, that to find markets for mass production, the workers must be paid maximum wages consistent with all the other economic factors of industry and business—a practical example in the distribution of wealth. Unfortunately for the economics of our times, this is not so readily accomplished on a national, all-industry scale, by theorists and law makers, as it was by the very practically-minded, sole owner of a single business, big as the Ford Motor Company was and is.

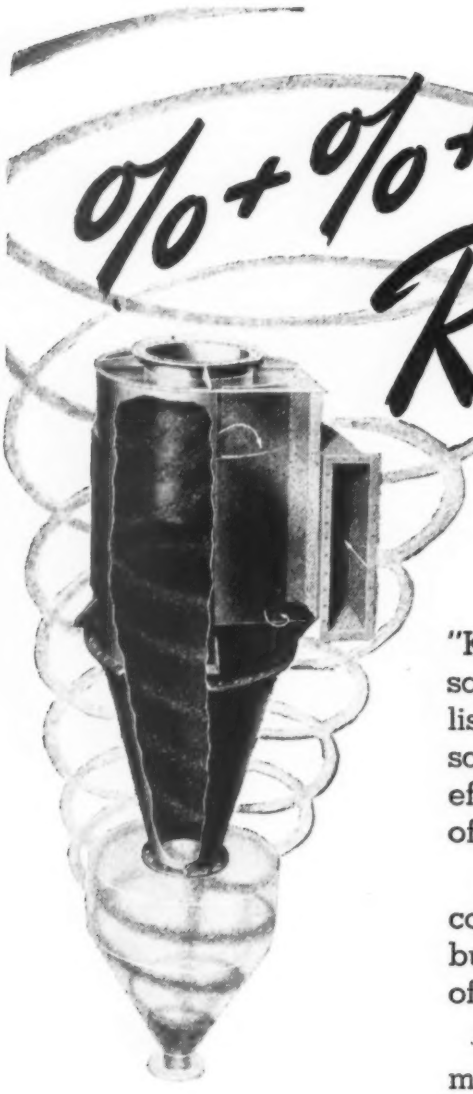
The sad part of a commentary on Henry Ford's career is that as in the case of practically every other genuine benefactor of mankind, he lived to see those who had benefitted most from his applied philosophy, the employees of his own plants, eventually turn against him; and try to force his hand by skulduggery, the same as they used on other employers, some of whom might possibly have merited at least some of it. He, too, came eventually to harvest the crop from the seeds he had sown for high wages, high purchasing power and high production. For those universal desires for material things once stimulated are not easily satisfied.

Having Cake and Eating It, Too

Lacking great practical minds like Henry Ford's in places of public responsibility to direct and control such desires within economically possible limits, his own sound principles have been distorted into a widespread belief that mankind in America, in the United States, at least, can have his cake and eat it, too. He has not yet learned that he can not have high wages, an expensive, paternalistic and internationally-minded government, social security, pensions, unemployment insurance, group life insurance and all the other accompaniments of modern society without paying through the nose for them out of present wages or income.

In all this present discussion about high prices and 65-cent dollars, little is said about the effect on cost of living of this "take" of national and local taxing authorities out of every dollar spent. This take includes far more than sales or excise taxes, because out of the selling prices of products of industry must come directly and indirectly every cost of government, national, state and local, the old age pensions, insurance, etc. This cost is now easily from ten to twenty times what it was when Henry Ford was accumulating the capital for his great enterprise; and the wonder is that it has not increased the prices of things even more than it has. That he made better and more practical use of his surplus than present day politicians and statesmen, who are now garnering and spending the proceeds, we think is self-evident; but that is not to assume that the philanthropy and humanitarianism now imposed on all employers by legislation may not some day prove a blessing.

What is needed most are men with minds like Henry Ford who will be willing official public servants, instead of volunteer, autocratic and unofficial ones, such as he was. If men of this character are put in public office under our very imperfect political system, and permitted to use the public funds with the same intelligent foresight that Henry Ford used his own money, we might become almost a Utopia.



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Association NEWS

CLOSING of the coal mines by the Government for safety inspection following the Centralia coal mine disaster and John L. Lewis' order keeping the men out of the mines until federal inspectors had certified mines to be safe has drastically cut down coal production. Although Lewis modified his order and the miners have been coming back in increasing numbers, the effect has been a loss of more than two-weeks' coal production. It has been predicted that the shutting down of blast furnaces will intensify the present steel shortages and cause a very close balance between supplies and demand this coming Winter. The really big worry is the possibility of a strike coming after the government controls cease on July 1 this year. As large users of fuel, the rock products industries are very much concerned with this situation.

Reports from Washington indicate the limitations placed on non-housing constructon will be eased considerably more. On top of a recent increase to $50,000,000 a week, it is believed that this figure will be upped to $60,000,000 a week. This will help to release more contracts for plant improvements and additions within the rock products industry, and create more business for producers of aggregates, cement and gypsum and take up any slack due to a falling off in residential building.

Limitations on Penalties Under Price Control Act

J. R. BOYD, secretary, National Crushed Stone Association, recently issued a bulletin covering H.R. 2522, introduced in the House of Representatives by Representative Peterson of Florida, which provides certain limitations on penalties or liabilities arising out of the Emergency Price Control Act of 1942, when the violations on which such penalties or liabilities were incurred were not willful.

The case of Seminole Rock and Sand Co. is cited as an example of the hardship involved. A suit was filed against this company by OPA, and the case was won in the U. S. District Court at Miami and later in the Circuit Court of Appeals. The government carried the case to the U. S. Supreme Court where it was reversed with the comment that there were adequate avenues of relief from hardship open to Seminole Rock and Sand Co. Retrial in the District Court at Miami resulted in a judgment against the company for some $48,000. The judgment was stayed while an appeal was taken to the Emergency Court of Appeals, which on March 12, 1947, stated that its limited jurisdiction afforded no remedy to the company. In rendering its decision, the Emergency Court of Appeals said, ". . . From everything that appears, complainant exercised the utmost good faith in the transactions in question, and application of the actual delivery provisions of the regulation results in extreme hardship. But the limited jurisdiction of the Court affords no remedy to complainant." Unless Congress passes legislation of the type covered in H.R. 2522, producers confronted with similar circumstances will have no opportunity for relief. The bill is now before the House Committee on Banking and Currency.

Wage and Hour Law Violations

The U. S. Department of Labor, Wage and Hour and Public Contracts Divisions has published statistics on violations under the Stone, Clay and Glass Products Industry division. This industry had to pay $276,000 in back wages to 6000 employes for these alleged violations. It is claimed that violations were found in 58 per cent of the 600 inspections. Overtime violations were the most common, and only 9 per cent of the violations were involved in the minimum wage standards. Ten per cent of the inspected employers violated the child labor provisions of the laws. A frequent cause of unintentional violations is misapplication by employers of the exemption provisions of the Wage and Hour Law, under which certain employes may be exempt from the law's minimum wage and overtime provisions as "executive," "administrative" or "professional" employes.

Gwynne-Wiley Bill in Conference

Executive Secretary V. P. Ahearn of the National Sand and Gravel Association has advised the membership concerning the status of the Gwynne-Wiley bill which was in conference at the time this was written.

Mr. Ahearn gave an analysis of the bills as passed by the House and Senate. He points out that with respect to retroactive portal-to-portal claims, either the Senate or the House bill will be satisfactory. However, the House bill validates compromise settlements of wage-hour claims, but no similar provision is in the Senate bill. The House bill contains a more comprehensive good faith clause, whereby an employer who followed administrative rules and regulations in good faith would not be liable for retroactive payments of either wages or penalties in the event of changes in the rules.

This is an important phase of the bill since under the so-called Walling ruling every company in the industry was exposed to employe suits of bankrupting characteristics. The Senate good faith clause protects employers only from imposition of penalties and liquidated damages. The employer would still be liable under the Senate bill for payment of additional wages back to October 24, 1938, the effective date of the law. The House provision would give the employer who has complied with the regulations, full good faith protection from retroactive wage claims as well as liquidated damages. The House bill provides a one-year statute of limitations; the Senate bill stipulates two years. The latter limitation seems likely to be incorporated in the conference report.

It is hoped that President Truman, as predicted by some, will not veto the bill which comes out of conference.

England Forms Slag Group

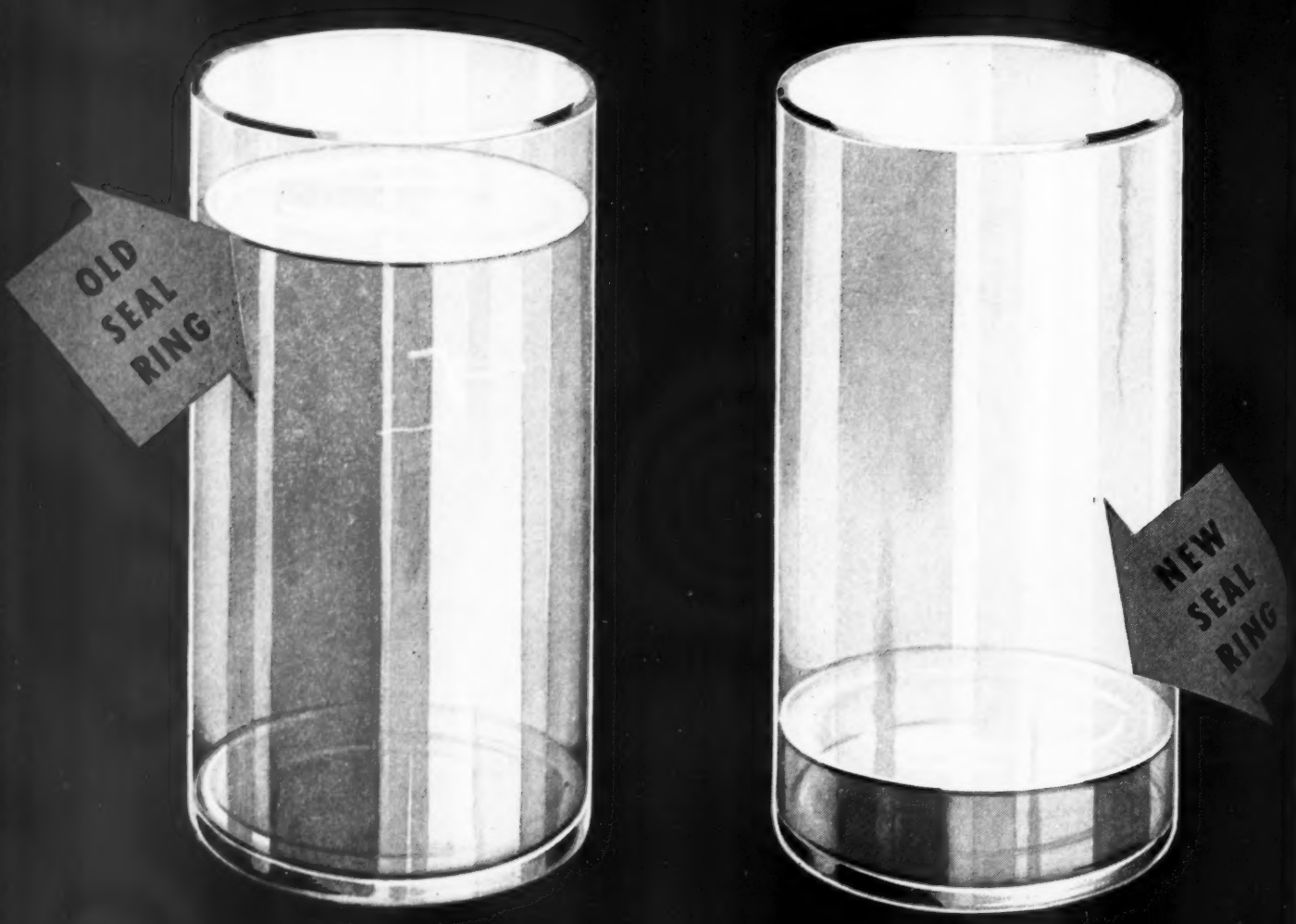
FOAMED SLAG PRODUCERS FEDERATION is the name of a new organization to promote the use of lightweight slag aggregates. M. Gallai-Hatchard is general manager of the federation with offices in Grosvenor Gardens House, Grosvenor Gardens, London, S.W.1, England.

Resume Industry Surveys

THE FEDERAL TRADE COMMISSION has announced that it will resume publication of industrial corporation surveys which was discontinued with the 1940 reports. Among the industries for which surveys will be prepared are: wallboard and plaster (except gypsum); building insulation and floor composition. The first forms to be filled out by industry will be sent out in a few weeks. Replies are said to be mandatory.

Will Lay Heavy Block

IN SEVERAL AREAS difficulty has been encountered with the local bricklayers union in laying units weighing more than 23 lb. The matter has been brought before the International Union which has issued a ruling to local unions that this procedure must not be followed.



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A "new type" of seal ring at the stuffing box gland of Hydroseal Slurry Pumps now makes dilution of the solution pumped infinitesimal. Only 15% of the former low amount of sealing water is now required, this saving being obtained without affecting the other operating characteristics of the pump in any way. In fact, the new seal ring can be installed on any Hydroseal Slurry Pump now in use.

In addition to the new seal ring, the new Hydroseal Slurry Pumps have new anti-friction bearings, a new axial shaft adjustment and a new "three way discharge" pump shell. Write us for further information.

the Personal Side of the news

Plant Manager

H. M. LEEDS, in charge of office sales and deliveries for the Concrete Products Co., Tucson, Ariz., has been appointed manager of the Tucson plant. ERNIE PETO, formerly shop foreman, has been promoted to production foreman which also includes supervision of maintenance. Z. E. SQUIRES remains as cashier and office manager. These changes were announced by C. J. Wilkerson, owner of the plant, who also reports that the Irving, Texas, plant has been converted to the production of California tile, with Phillip F. Smith as manager and Ike Ellis as production foreman.

Edison Foundation Chairman

BLAINE S. SMITH, president of the Universal Atlas Cement Co., New York, N. Y., has accepted the chairmanship of the cement division of the Thomas Alva Edison Foundation, Inc. The Edison Foundation was organized last year by a group of the nation's industrial and business leaders and is seeking $2,590,000 in a nation-wide solicitation to carry out its objectives which are the acquisition and preservation of the Edison library and laboratories at West Orange, N. J.; the establishment of the Edison Center for discovery, research and invention; and the restoration of the nation-wide Edison scholastic competitions which were sponsored by Mr. Edison in the last two years of his life. HARVEY S. FIRESTONE, JR., president of the Firestone Tire and Rubber Co., is national chairman.

Thomas Edison has made many contributions to the cement industry. He entered the portland cement business in 1899 at which time the Edison Portland Cement Co. was organized. The normal kiln at that time was 60 ft. long or less, with a maximum daily capacity of about 200 bbl. of cement clinker. Mr. Edison devised a rotary kiln 150 ft. long to produce 1000 bbl. of cement clinker in 24 hours. He is credited also with having been the first to adapt the steam shovel and the big crusher to the quarrying of cement rock, and also pioneered in the development of the monolithic concrete house.

Mr. Smith, for many years an outstanding figure in the cement industry, began work with the Chicago and Northwestern Railway in Chicago. Ten years later he joined the Universal Atlas Cement Co. as a salesman, became metropolitan sales manager in Chicago and later vice-president and general sales manager. In 1928, he was elected president of the Pennsylvania-Dixie Cement Corp., and in 1936 returned to Universal Atlas as president. He has served as president and chairman of the board of the Portland Cement Association and as president of the Cement Institute.

Photo by Fabian Bachrach

Blaine S. Smith

Becomes Vice-President

PAUL B. FEGELY, manager of the Modern Valve Bag Co., Humboldt, Kans., has been appointed vice-president of the Monarch Cement Co., to succeed C. A. Brooke., who has retired. Mr. Fegely has been a member of the board of directors of the cement company since 1945 and will continue to supervise the packaging operations at the Humboldt plant.

Sales Managers

THOMAS C. DUNHAM, who has had 20 years' experience in the building material and construction field, has been appointed manager of city sales for the Poston Brick and Concrete Products Co., Springfield, Ill. Charles L. Turley, formerly city sales manager, has been made district sales manager.

Heads Nebraska Group

EARL W. PETERSON, Omaha, was recently elected president of the Nebraska Concrete Masonry Association. Other officers are: M. H. Finney, Grand Island, vice-president; Chris Hanley, Chappell, vice-president; Paul B. Moser, Lincoln, secretary, and Horace Young, Wahoo, treasurer.

Retires

J. J. HORNUNG, assistant treasurer, in charge of credits in the Chicago, Ill., office of the Lehigh Portland Cement Co., Allentown, Penn., has retired after 37 years of service with the company. L. A. STACK will succeed Mr. Hornung as assistant treasurer.

Technical Service Director

FRANK E. LOBAUGH, formerly technical service manager, has been appointed technical service director of the Lumnite Division of the Universal Atlas Cement Co., New York, N. Y.

Frank E. Lobaugh

Mr. Lobaugh attended the University of Pittsburgh and Alfred University, Alfred, N. Y., where he specialized in ceramic engineering and where he subsequently received a degree of ceramic engineer. From 1930 to 1940 he was assistant professor in ceramic engineering at Alfred University. In 1941 he joined the technical division and sales department of the Atlas Lumnite Cement Co., now the Lumnite Division of Universal Atlas Cement Co., and in 1944 was appointed technical service manager.

Retires as President

GEORGE KISSLING, president of the Winona Sand and Gravel Co., Winona, Minn., has retired after serving seven years as president of the company. A new president will be named by the board of directors in the near future.

Transportation Representatives

ERNEST V. APT, sales and traffic manager for the Southwestern Portland Cement Co., Osborn, Ohio, and RALPH MORDEN, traffic manager for Marble Cliff Quarries Co., Columbus, Ohio, were representatives at the recent meeting of the Ohio Valley Transportation Advisory Board in Columbus. Mr. Morden is also chairman of the Crushed Stone, Sand and Gravel Committee of the Advisory Board.

Joins Alpha Sales Force

CARL H. SCHLUTOW, Belleville, Ill., has joined the sales force of the Alpha Portland Cement Co., Easton, Penn.,

Carl H. Schlutow

and Chicago, Ill. He will travel central-eastern Illinois for the district sales office at St. Louis, Mo. Mr. Schlutow was formerly with the sales force of the Missouri Portland Cement Co., St. Louis, Mo.

Engineering Society Officers

ARTHUR HEWITT of the Warner Co., Philadelphia, Penn., has been elected president of the Central Pennsylvania Chapter of the Pennsylvania Society of Professional Engineers. L. D. RICHARDS, chief engineer of Dow Chemical Co., Midland, Mich., was appointed a director of the Saginaw Chapter of the Michigan Society of Professional Engineers; ARTHUR F. PLANT, president of Austin Engineers, Inc., and manager of the Detroit office of Austin Co., was named president of the Detroit Chapter of the Michigan Society of Professional Engineers; and THERON C. TAYLER, Tayler Engineering Service, Detroit, Mich., was elected treasurer of the Detroit Chapter.

On Labor-Management Committee

ROLAND WHITNEY, secretary of the Louisville Cement Co., Louisville, Ky., has been appointed to the Louisville Labor-Management Committee as a representative of the industry. Mr. Whitney has been with the company for 25 years, starting as a clerk. He served for 14 years as purchasing agent and in 1941 was made secretary.

Awarded Key

MARK SNYDER, director of industrial relations, Marblehead Lime Co., Chicago, Ill., was recently presented with a key by the National Association of Personnel Directors for his outstanding contributions in the field of better understanding in management-labor relations. The presentation was made by Philip H. Ragan, president of the association of which Mr. Snyder is a charter member.

Service Engineer

N. J. MCELRATH has been appointed service engineer for the Hermitage Portland Cement Co., Nashville, Tenn. His 15-year experience in all phases of concrete engineering matters will be available as a company service. A graduate of the University of Kentucky School of Engineering, Mr. McElrath served two years with the Kentucky State Highway Department on highway construction and location;

N. J. McElrath

subsequently with the U. S. Engineers in the Memphis District, and Tennessee Valley Authority on floodway, highway and railway location, design and construction. He also served with the Universal Atlas Cement Co. and the Pressure Concrete Co.

Joins Brick Firm

HENRY D. OSTERHOLZ, formerly New York City sales manager for the Lehigh Portland Cement Co., Allentown, Penn., has been appointed general sales manager of the Anderson Brick and Supply Co., Inc., New York, N. Y.

Named Director

JACOB O. KAMM, professor of economics and chairman of the School of Commerce at Baldwin-Wallace College, has been elected a director of the Kelley Island Lime and Transport Co., Cleveland, Ohio.

Makes Donation

HARRY B. MATHEWS, JR., president of the Mississippi Lime Co., Alton, Ill., donated $5000 toward the $750,000 expansion campaign of the Central Institute for the Deaf at St. Louis, Mo.

Reelected President

WILLIAM J. SPROW, SR., has been reelected president, treasurer and general manager of the Wagner Quarries Co., Sandusky, Ohio. Russell A. Ramsey was reelected secretary.

Director

CLIFFORD HEMPHILL of Hemphill, Noyes & Co., brokers, has been elected a director of the Lawrence Portland Cement Co., New York, N. Y.

New Superintendent

FRANK DAVIS has been made superintendent of the Winterset, Iowa, plant of Sargent Bros., Des Moines, Iowa, producers of crushed limestone.

Expect Big Cement Year

ROGER GLEASON, president of the Wolverine Portland Cement Co., Kalamazoo, Mich., with plants at Quincy and Coldwater, has announced that the plants have been kept in operation during the winter to meet the demand for cement. Mr. Gleason expressed the opinion that 1947 cement production may reach an all-time high of 200,000,000 bbl.

Lime Plant Managers, National Gypsum Co., Buffalo, N. Y. Left to right: Bayard Magee, Kimballton; K. W. Waugh, Bellefonte; E. B. Hollingsworth, York; F. C. Mallery, Luckey, at recent company meeting

OBITUARIES

PERLEY W. SAWYER, who at the time of his retirement in 1941 was St. Louis branch manager of the Minnesota Mining and Manufacturing Co., St. Paul, Minn., died recently at the age of 73. He was also a former president of the Wausau Abrasive Co.

CHARLES P. BURTON, formerly advertising manager and editor of "Earthmover," an original magazine put out by Austin-Western Co., Aurora, Ill., died recently after a brief illness. He was 85 years old.

WILLIAM C. CHAMPION, district manager of the Pacific Northwest territory of the Shovel and Crane Division, Lima Locomotive Works, Inc., Lima, Ohio, died April 4 at the age of 65.

HENRY GOODLOW BRIDGEWATER, former president of the Superior Lime and Hydrate Co., Inc., Pelham, Ala., passed away in Daytona Beach, Fla., after a long illness. He was 63 years of age.

WARREN P. HUMBLE, executive secretary of the Kentucky Crushed Stone Association and of the Kentucky Association of Highway Contractors, died March 12 at the wheel of his automobile near Louisville, Ky. He was 44 years old.

ERNEST SEAMAN, manufacturer of concrete burial vaults at Sandusky, Ohio, since 1924, died on March 22 at the age of 53.

EARL F. LAWS, who had been in the gravel business at Keyesport, Ill., died recently. He was 51 years old.

WALTER W. MCCALL, who for the past five years had operated the Richland Limestone Co., Pulaski, Tenn., with his son, Jack McCall, died on March 17 at the age of 54.

FRANK IVES, manufacturer of burial vaults in Jasper County, Ill., for the past 25 years, died recently at the age of 67. He was the father of Burl Ives, the ballad singer.

MRS. MILLIE SCHILLING, treasurer of the Manegold Stone Co., Wauwatosa, Wis., died March 8. She was 70 years of age.

E. L. BERRY, vice-president in charge of production of Link-Belt Co., Chicago, Ill., passed away suddenly on April 3 at the age of 52. He was also a vice-president and director of Link-Belt Speeder Corp.

ALBERT E. TWIST, mechanical engineer for the Raymond Concrete Pile Co., New York, N. Y., passed away recently. He was 59 years old and had been with the company for about 30 years.

HARRY C. BEAVER, vice-chairman of the board of directors and formerly president of the Worthington Pump & Machinery Corp., Harrison, N. J., died suddenly on April 2. He was 71 years old.

HARRY O. GURDY of Rockland, Me., who was associated with his father some years ago in the H. O. Gurdy and Co., lime manufacturing business, passed away recently at the age of 88.

J. J. WILSON, Seattle branch manager of John A. Roebling's Sons Co., Trenton, N. J., passed away on March 6 at the age of 59.

LEWIS R. PETERS, traffic manager for Coplay Cement Mfg. Co., Coplay, Penn., died March 2. He was 49 years of age.

New Incorporations

Neuheisel Limestone Products, Inc., Eau Claire, Wis., has been incorporated to mine, quarry and deal in limestone and other stone, rock and minerals. Incorporators are Norbert, Anita and Phillip Neuheisel. Ingolf E. Rasmus is the attorney.

Allwood Lime Co., Rockwood, Wis., has increased its capital stock to $100,000, divided into 1000 shares at $100 par value. William J. Tills is president and C. E. Brady is secretary.

Western Lime Co., LaConner, Wash., has been incorporated with a capital of $50,000.

Fredonia Valley Quarries, Fredonia, Ky., has filed an amendment to its charter increasing the capital stock maximum from $20,000 to $50,000.

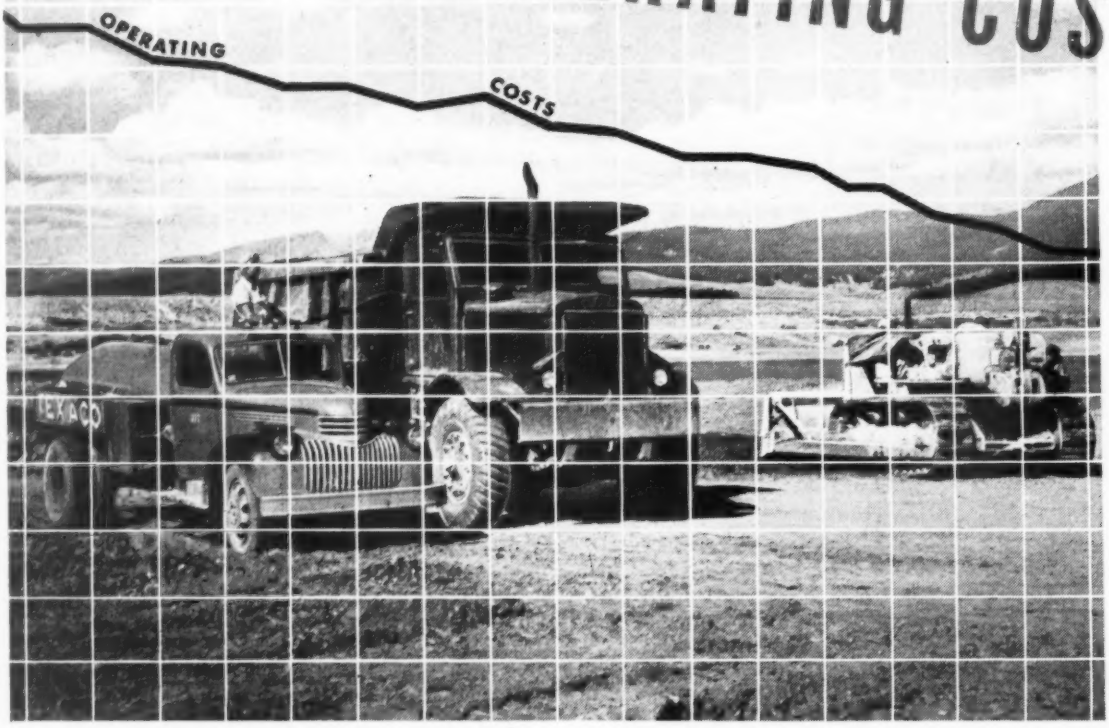
Swope Sand & Gravel Co., Ferndale, Wash., has been incorporated by Frank S. Swope with a capital of $15,000.

Newark Concrete Co., Newark, Del., has been organized to deal in lime, cement and similar products, with a capital of $100,000.

Ace Sand and Gravel Co., Columbus, Nebr., has been organized with a capital stock of $25,000. Incorporators are Robert E. Wilbur, Wesley W. Drew and Emil F. Kutilek.

Gypsum Plant Managers, National Gypsum Co., Buffalo, N. Y., who recently attended company meeting. Front Row, left to right: P. L. Tiedt, Akron; C. J. Taylor, Bronx; F. E. Gillett, Savannah; J. D. Kerr, Saltville. Standing, left to right: F. D. Crowley, Portsmouth; D. C. Chads, Medicine Lodge; D. C. Jeffrey, Clarence Center; C. E. Anderson, National City; J. E. Irvin, Rotan; H. J. Maisham, Fort Dodge

REDUCE YOUR OPERATING COSTS



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*Texaco Ursa Oil X*** is fully detergent, dispersive, resistant to oxidation . . . made to keep engines clean . . . free from power-stealing sludge, varnish, carbon. *Ursa Oil X*** keeps valves lively and rings free . . . protects parts against wear and bearings against corrosion.

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MAKE YOUR EQUIPMENT LAST LONGER

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Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

INDUSTRY News

Double Cement Capacity

FLORIDA PORTLAND CEMENT DIVISION, General Portland Cement Co., Chicago, Ill., has been issued building permits for $140,000 construction at the Hooker's Point, Fla., plant. This will be the first phase in the $1,250,000 expansion program that will double the production of the plant near Tampa, Fla. Frank M. Traynor, vice-president of the division, has advised that a 426-ft. kiln has been purchased from the Aluminum Co. of America. The new kiln will produce as much as the three 175-ft. kilns now in operation. Production will eventually be stepped up to 3,000,000 bbl. a year.

Install Dust Collectors

HERCULES CEMENT CORPORATION, Nazareth, Penn., has reported to the local Borough Council that much of the dust collection equipment on order has been delivered. A new system for reclaiming dust in high temperature gases is nearing perfection after nearly 10 years of experimental work by the cement company working with the Fuller Co.

COPLAY CEMENT MANUFACTURING Co., Coplay, Penn., is making an installation of dust collection equipment in its raw mill. Lawrence Portland Cement Co., Northampton, and Whitehall Cement Co., Cementon, also have dust collection projects under way.

New Office Building for Pacific Coast Aggregates

PACIFIC COAST AGGREGATES, INC., recently dedicated its new general office building at 400 Alabama street, San Francisco, Calif. This ultra-modern reinforced concrete structure provides working and comfort facilities for more than 100 employes. Several unusual features are found in this building. It has a water-filled roof for insulation, soundproof ceilings, and huge, decorative asbestos siding doors. Walls tinted light green and fluorescent lighting fixtures give maximum in lighting efficiency and eye-comfort. A specially designed ventilation system automatically controls the temperature of the building.

The engineering division is located in the building's penthouse with ample natural light from glassed-in surroundings. Adjoining the engineering division is a modern lunch-room which serves between 50 and 100 lunches per day to employes. Coffee is served workers during their mid-morning and afternoon relief periods. A large warehouse is located on the main floor.

Purchase Stone Deposit

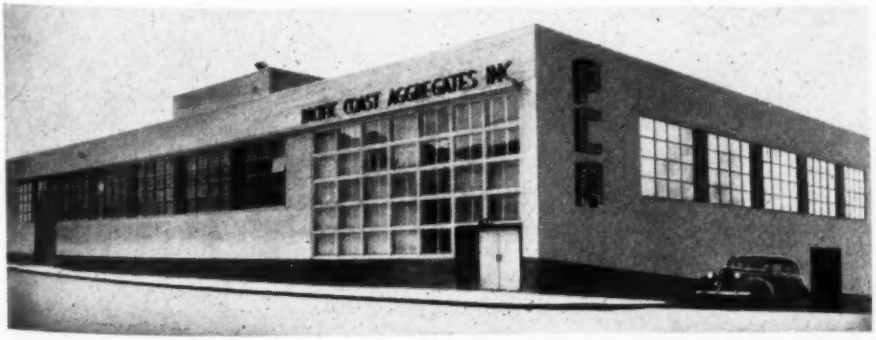
L. R. FALK has purchased a 17-acre tract 3½ miles north of St. Ansgar along the Cedar River. A crushing plant has been purchased by Mr. Falk, and it is expected that agricultural limestone and road stone will be produced about June 1. Mr. Falk, who spread 42,000 tons of agricultural limestone in Mitchell county in 1946, in addition to 70,000 tons of road gravel, expects 1947 to be an even bigger year.

Buy Limestone Concern

MERCER LIME STONE Co., at Wick and Branchton, Penn., has been purchased by C. Raymond Hutchison and J. Harry Peterson of Butler, Penn., and Dean D. Thompson of Vandergrift. S. S. Smith, former owner, is retiring from the crushed stone business. Mr. Smith also operates the Township Coal Co., and is associated with his son, R. Heath Smith, in the Gilson Screen Co., Mercer, Penn.

Expand Gravel Operations

OIL CITY SAND & GRAVEL Co., Oil City, Penn., plans to build a new plant along the Allegheny river in the vicinity of Two Mile run, according to Capt. Chas. Smith, vice-president of the company. The plant will cost about $75,000.



Modern reinforced concrete office structure

Increase New Orleans Cement Plant Capacity

LONE STAR CEMENT CORPORATION, New York, N. Y., has announced plans for enlarging the capacity of its New Orleans, La., plant. Additional facilities comprise a 385-ft. kiln with a capacity of 2000 bbls. a day, together with the installation of a large combination mill for raw grinding and a new finish grinding unit to bring total capacity of the plant up to 6000 bbls. daily.

This program involves an expenditure in excess of $1,000,000, and contracts are being placed for the delivery and installation of the necessary equipment. It is planned to have this additional plant capacity available by the end of 1947.

Building Formosa Cement Plants

TAIWAN CEMENT CORPORATION has been organized by the Chinese government under the auspices of the National Resources Commission of China to build cement plants on the Island of Formosa. The General American Transportation Corporation, Process Equipment Division, has the contract for reconstructing and operating the three cement plants. The president of the company is Dr. Hsu Tsung-shu with headquarters in Taipeh, Formosa. L. N. Bryant, well-known to the American cement industry, will accompany A. J. Anderson to Formosa. Mr. Anderson will have charge of the rehabilitation project.

Sell Crushing Plant

EVERETT & CLARK, contractors of Plattsburgh, Mo., have sold their secondary crushing plant near this city to H. W. Hayes who will install the plant at a quarry near Bethany, Mo. Everett & Clark are improving their plant by installing new portable equipment for the production of agricultural limestone and crushed stone in De Kalb and Clinton counties.

Buy Gravel Pit

CALVIN E. DOWDS, Mount Vernon, Ohio, has purchased the Barr gravel pit near Rich Hill from Doyle Moreland of Centerburg. Mr. Douds also has a gravel pit at St. Louisville, Ohio.

Add Crushing Capacity

MINOT SAND AND GRAVEL Co., Minot, N. Dak., has purchased a combination jaw and roll crusher to increase plant capacity of crushed gravel, according to an announcement by Clarence E. Wood, secretary-treasurer of the company.

Abandon Cement Plant In Hawaii

HAWAIIAN GAS PRODUCTS, LTD., Honolulu, Hawaii has announced that it has abandoned cement manufacturing operations. A complete survey indicated that profitable operations of the small production plant was impossible under conditions prevailing and in the foreseeable future. The plant was a remodeled hydrated lime and mineral filler (ground limestone) plant. It was operated as a cement plant with the hope that it might grow into a profitable cement producing operation. However, the company continues to produce hydrated lime. It has been definitely proved, however, that a high grade portland cement as well as a portland pozzolana can be manufactured from raw materials available at Waianae.

Cement for Dams

THE BUREAU OF RECLAMATION recently awarded contracts totaling $1,061,199 for construction in five western states, the largest being for Davis dam on the Colorado river. The Monolith Portland Cement Co., Los Angeles, Calif., will supply 120,000 bbl. for $345,216, and the Southwestern Portland Cement Co., Victorville, Calif., 40,000 bbl.

Dust Suit

UNIVERSAL ATLAS CEMENT CO. is being sued for $135,000 in alleged damages to crop and grazing land near its Waco, Texas, plant. The plant is nine miles from Waco on McGregor highway. The plaintiffs' petition asks for $35,000 damages to their land from the cement plant dust, for an injunction to stop the company from permitting dust to come out of its smoke stack, and for $100,000 "future damages" if the injunction is not granted.

S. America Cement Shipments

IDEAL CEMENT CO., Mobile, Ala., has been shipping a large volume of portland cement to Venezuela, Panama, Dominican Republic, Puerto Rico and other South American countries from its newly acquired Mobile plant. Oyster shells are used to supply the calcium carbonate for cement manufacture.

Open New Plant

BRATTLEBORO SAND AND GRAVEL CO., INC., Brattleboro, Vt., has started operating its new crushed stone and sand and gravel plant. The company also will supply ready mixed concrete with two mixer trucks. Emory A. Felch is president and Hugh A. Bradley is treasurer of the company.

Buy Gravel Barges

J. K. DAVISON & BRO. CO., Pittsburgh, Penn., has ordered two 7 ft. 6 in. by 27 ft. by 135 ft. all-welded steel barges from Dravo Corporation. The barges will be of the raised deck type for transporting sand and gravel.

Acute Plaster Shortage

REPORTS from Spokane, Wash., indicate that there has been a very serious shortage of all building materials in the Pacific Northwest, but plaster has been particularly short.

Cement for Angostura Dam

THE SOUTH DAKOTA cement plant at Rapid City, S. Dak., is participating in the production of cement for Angostura dam being built by the Reclamation Bureau.

California's New Plants

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., is completing construction of two aggregate plants, one near Tracy and the other near Pleasanton, Calif. The Kerlinger plant in the Tracy area will cost a half-million dollars and will be composed of three separate units: a road rock plant, a sand and gravel plant, and a crushed rock plant. It will be capable of producing in excess of 20 different sizes of material. A 3½-cu. yd. shovel will load approximately 400 t.p.h. to a 36-in. belt conveyor which will transport material to a raw storage stockpile of 10,000 tons with a live storage capacity of 6000 tons. The Eliot plant near Pleasanton will be completed this Fall at a cost of about one million dollars, and will be double the capacity of the Kerlinger plant.

Propose Alaska Cement Plant

ALASKA CEMENT CO., Seldovia, Alaska, is the name of a proposed cement concern which will be financed by Parker A. Lyle, Basil Sinclair, and Charles B. Abbott of Anchorage, Alaska, and Dean Peterson, Portland, Ore. These men also control the coal company at Homer, Alaska.

New Gravel Firm

EDGAR J. GURZICK, Sault Ste. Marie, with the assistance of his father, JOSEPH J. GURZICK, has organized the Gurzick Supply Co., which at present deals in gravel products but expects to expand to include a warehouse service. Mr. Gurzick is also being assisted in the new enterprise by his sister, Miss Josephine Gurzick.

Form Sand Company

NICHOLS AND LEHMAN SAND CO., Gypsum, Kans., has been organized by C. E. Nichols and Marvin Lehman. A site on the Solomon river has been leased, and dredging operations are under way.

Sand Pit-Asphalt Plant

COX BROS. CONSTRUCTION CO., Stanton, Calif., has won approval of the County Planning Commission for the development of a sand and gravel pit and the construction of an asphalt plant near Santa Ana, Calif., about two miles north of Corna Del Mar.

Sell Lightweight Aggregate Plant

FLORIDIN CO., Quincy, Fla., is reported to have purchased the Fuller's earth nodulite plant at Ellenton, Fla., from the War Assets Administration. During the War, the Ellenton plant converted Fuller's earth into a lightweight aggregate used in construction of concrete ships at Tampa, Fla.

Fleet Safety Contest

DRIVERS of the Permanente Cement Company's big bulk trucks have maintained their first-place spot in the

Two-unit Pioneer plant of E. W. Coons Co., Hibbing, Minn., crushing and screening gravel for highway and airport work in northern Minnesota

Fleet Safety Contest being conducted by the San Francisco Chapter of the National Safety Council, by totaling 1,512,000 miles during 1946 without a chargeable accident. This was brought out in a talk which Sergeant Paul Perussina of the California State Highway Patrol gave as guest speaker at a dinner in San Jose honoring the Permanente drivers and their garage personnel. Following his talk, Sergeant Perussina presented the drivers with identification cards and medals. Men who had driven five years or more without an accident were presented with engraved billfolds by the Permanente Cement Co.

Natural Cement for Minnesota Highways

A BILL has been passed by the Minnesota House of Representatives requiring the State Highway Commissioner to specify 15 per cent natural cement and 85 portland cement in all state highway paving jobs let in 1948.

Closed-Circuit Grinding

FOUR new cement plants in the United States will use the Dorr system of closed-circuit grinding on the raw end with two more to follow, according to an announcement by The Dorr Co. Additional systems are being supplied to cement makers in China, Columbia, Chile and Panama.

Advertising Campaign

THE CELOTEX CORPORATION, Chicago, Ill., has announced plans for an extensive advertising campaign on all Celotex products. Manufacturing facilities also will be greatly expanded. Henri, Hurst & McDonald, Inc., Chicago, has been appointed the advertising agency for the company.

Purchase Sand Concern

E. L. DAUPHINAIS, INC., North Grafton, Mass., has purchased the plant and sand pit of Birnie Sand and Gravel Co., in North Willbraham, Mass., from the estate of Stuart G. Rutherford.

Convert to Cement Boat

PERMANENTE STEAMSHIP CO. is converting a 10,800-ton vessel purchased from the Maritime Commission for handling cement and crushed stone or sand and gravel. Renamed the Permanente Silverbow, the vessel is being refitted with a Leatham D. Smith self-unloading system which includes pneumatic equipment for 'blowing" cement into and out of the holds, and with elevators and boom conveyors for the unloading of rock materials. The ship's unloading capacity will be 2000 bbls. of cement and 500 tons of crushed rock per hour. Dust collecting equipment will be used.

Lime Quarry Again Busy

OPERATIONS at the old Harris Lime Co., quarry near Lincoln, R. I., have been resumed after a 33-year shutdown. Operations will be resumed for the production of agricultural limestone rather than lime. The old kilns are still visible, but will not be restored.

Start Batching Plant

BREMSER COAL & SUPPLY CO., Norwalk, Ohio, has started operations at its concrete batching plant which has a capacity of 110 tons of concrete an hour.

Ask Dredge Permit

THE JEFFERSON CITY SAND CO., Jefferson City, Mo., has filed a request with the War Department for a three-year extension on its permit to dredge sand and gravel in the Missouri River.

Approve Gypsum Expansion

NATIONAL GYPSUM CO., Buffalo, N. Y., has announced that the CPA has approved plans of the company to build a $164,000 addition to its plant at Niles, Ohio. The new addition will be used for the manufacture of metal lath.

Modernize Alpha Plant

ALPHA PORTLAND CEMENT CO., St. Louis, Mo., plant will be modernized at an expenditure of over $500,000. Among the improvements will be a completely new dust collection system.

New S. Dakota Cement Plant

PROPOSALS are being advanced to the South Dakota State Cement Commission that a second cement plant be built to supplement the present plant at Rapid City, South Dakota.

Slag for Airport

CLEVELAND SLAG CO., Cleveland, Ohio, has been awarded a contract by the City of Cleveland for $426,000 to supply aggregates for the lake-front airport.

COMING CONVENTIONS

National Industrial Sand Association, Fall Meeting, Grove Park Inn., Asheville, N. C., October 1-3, 1947.

National Sand and Gravel Association, Director's Meeting, French Lick Springs, French Lick, Ind., August 14.

National Ready Mixed Concrete Association, Director's Meeting, French Lick Springs, French Lick, Ind., August 14.

Cement Production

BUREAU OF MINES reports that production of finished cement during February, 1947, totaled 12,521,000 bbl. or 35 per cent greater than that reported for February, 1946. Shipments of 8,347,000 bbl. were 6 per cent above those reported in the same month of the previous year. The relatively small increase in shipments is attributed to the usual seasonal trends of curtailed construction in the cold weather months in many parts of the country. Demand for cement was higher in six districts and lower in 12, than that reported for February, 1946. The Hawaiian plant has been closed permanently and dismantled.

The long-term trend in production of finished cement continues upward, increasing since November of 1946 at the rate of three to three and three quarter million barrels per month.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of February, 1947 and of February, 1946.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	Feb. 1947	Feb. 1946	Jan. 1947	Dec. 1946	Nov. 1946
The month ..	68.0	50.0	66.0	71.0	78.0
12 months ...	71.0	46.0	70.0	68.0	66.0

Adds Ready Mix

FAIRVIEW CONCRETE PRODUCTS CO., Carthage, Mo., a new company, has expanded its operations by the construction of a ready mixed concrete plant. The concrete block plant has a precast department for the manufacture of sills, lintels, coping, fence posts, and concrete joists. Doyle N. Davis is plant manager, and W. E. Harber is sales manager of the company.

Start Sand Operations

THE OCHOCO SAND AND GRAVEL CO., Prineville, Ore., is now in operation at Hogan's ranch on Ochoco Creek, four miles from this town. Bob Hogan and Gerald Miller are the owners and operators.

Pavement Yardage

AWARDS of concrete pavement for March and the first three months of 1947 have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During March, 1947	Square Yards Awarded During First 3 Months of 1947
Roads	1,577,991	3,264,204
Streets and Alleys..	807,756	1,901,051
Airports	52,061	78,661
Totals	2,437,808	5,243,916

Ask for Dredge Permit

MERIWETHER SUPPLY CO., Shreveport, La., has requested permission to dredge sand and gravel from the Red river over a 20-mile stretch centered in Shreveport.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Settling Basins

WHERE the dirty wash waters from a sand and gravel plant meet a fisherman there is apt to be trouble, particularly on the Pacific Coast where the trout literally jump at you (so the story goes). Therefore during the fishing season operators must not allow much waste material to get into the streams or the Fish and Game Commission will listen to the fisherman first and the operator, not at all.

Settling basins to retain wash water during fishing season

At one western operation during this 4-month season, all wash waters are diverted into a series of settling basins which are each about 200-ft. square, and separated by suitable dirt banks built up by bulldozers. Overflow pipes from basin to basin are provided. Enough of these basins (four or more) are strung along the roadway, giving sufficient settling area for nothing but clear water to reach the creek. A large part of the water sinks into the ground.

Bearing Puller

By C. A. COUCHMAN

Ch. Elec., Lone Star Cement Corp., Houston, Texas

IN the accompanying illustration is a bearing puller which has been found to be very effective for the removal or installation of motor bearings. Instead of using the crude method of hammering the bearing in or out with the aid of pieces of wood, requiring several hours, the job can now be done in less than 30 min.

Details of the bearing puller are shown in the illustration. A patent has been applied for. To operate the bearing puller, insert puller in bearing until lug springs out in oil ring slot. Place puller housing over stud, and put on washer and nut. Screw the nut down, drawing bearing out of end shield. This puller is for any 2½-in. sleeve type bearing, but other sizes may be made to fit any size bearing.

Hold-Down Clamp For Electrical Repairs

By PAUL C. ZIEMKE

ILLUSTRATED is the versatile and highly efficient hold-down clamp devised for the electrical repair shop. It is easily adapted to any motor of a size to fit within its limitations. It holds the stator rigidly while removing old windings or replacing new and the clamp may be released speedily when a shift of position of the motor is made.

In the foreground is clamping device to facilitate motor repairs; to the left is series test lamp; and to the rear, right, is varnish dipping tank

In the same view is pictured the repairman's best friend in the form of the series lamp testing device. Note that the lamp is one of minimum size, it being a 5-watt Neon type. This small bulb will under no circumstances pass sufficient amperage to seriously shock or kill even a child. As an additional safety precaution the lamp is inserted in the live or "hot" leg of the 115-volt circuit to further safeguard the workman using the device to test for shorts, opens or grounds in his winding jobs.

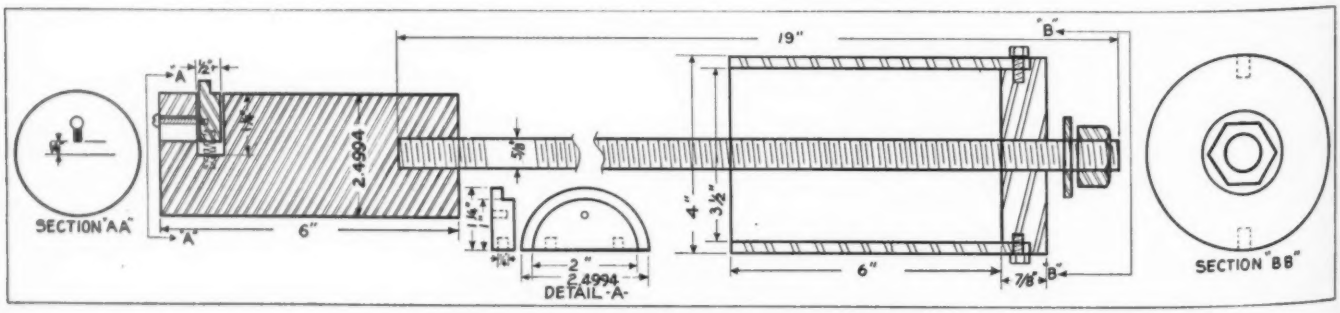
In the rear of the foremost workman can be noted the dipping tank where all the finished transformer and motor jobs are given a coat of electrical varnish and are later baked in an electrically heated oven.

The two men shown are kept busy maintaining the shop repairs of two large quarries and a gravel pit located in the Oak Ridge Military Area at a large saving over the costs of letting the work out to distant electrical repair shops.

Eliminating Cement Dust At the Mixer

JANESVILLE SAND AND GRAVEL CO., Janesville, Wis., a well-known producer of sand and gravel and more recently ready mixed concrete, recently opened a concrete products plant. J. R. Jensen, the ingenious plant superintendent, decided that he wanted his plant as clean as possible and devised the following arrangement to eliminate cement dust from a common source of trouble.

Mr. Jensen worked out an arrangement to use steam to blanket the usual dust cloud at the mixer. A 1-in. steam pipe is located on top and lengthwise of the mixer drum. Two lines of 1/16-in. were drilled in the pipe about 6 in. apart. The radial angle between the two lines of holes should be such that the small steam jets are directed just below the top edge of the sides of the mixer. Located within convenient



Details of bearing puller for any sleeve type bearing

reach of the mixer operator, preferably near the water valve, is a hand-operated steam valve.

Steam is turned on just before the cement is discharged from the overhead cement weigh batcher and is turned off when all cement is in the mixer and is wetted sufficiently not to create a dust cloud. While this is the arrangement followed by Mr. Jensen, he points out that the details may be varied to provide the same blanket effect.

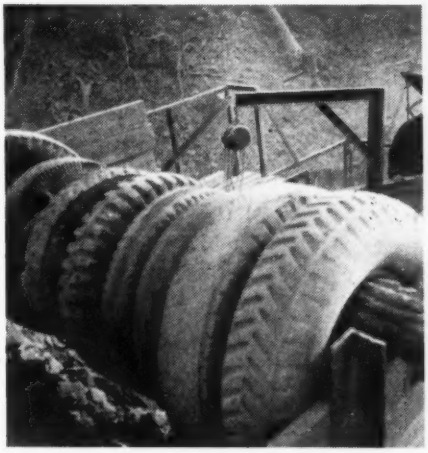
The mixer operator is very pleased with this very effective method of keeping down dust, providing a cleaner plant and surrounding atmosphere and also less dust to get into machinery and motor bearings.

Improvised Bins and Grizzly Feeder Protection

By FRENCH SENSABAUGH

WHEN G. C. Sensabaugh, Inc., contractors and crushed stone producers, launched into the operation of its crushed stone plant, it could not get bins and therefore decided to improvise its own. Some worn and outmoded steel hopper freight cars were discovered and purchased. New bottoms were welded into the cars and gates built into them. They were then hoisted with cranes and placed on concrete piers and steel pipe filled with concrete as shown in the illustration, making some very serviceable bins.

Another problem solved at this plant was the breaking of a number of rolls on the grizzly feeder from the impact of the dumped stone. As shown in one of the illustrations, a shock absorber was devised by Orrie Sensabaugh, plant manager, using old tires. This shock absorber was placed across the top of the feeder, taking the impact of the stone. An old tree trunk in slots holds the tires in place. Large tires were used on the outside graduating to smaller sizes in the middle. The tires spin and bounce when a load is dumped, but the shock has been eliminated and no rollers have been broken since its installation. This "Rube Goldberg" feeds the stone onto the grizzly and has permitted freeing the man for other work who formerly stood by to bar loose any lodged rock.

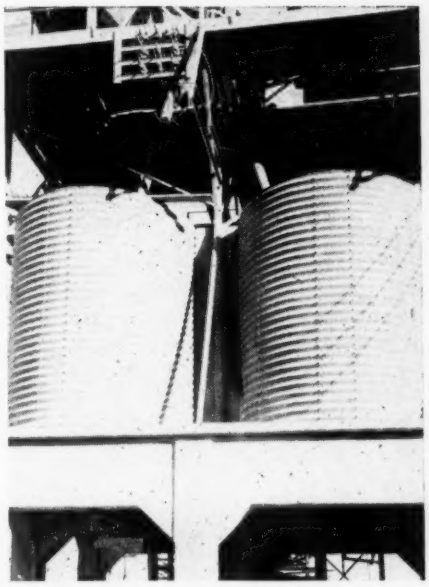


Tire protector for grizzly feeder takes stone impact and regulates feed

In the illustration, an improvised swiveling derrick with chain block may be seen. This is used to dislodge or move large rock so that the jaw crusher can bite into it, eliminating "brawn" and barring to get the big piece started.

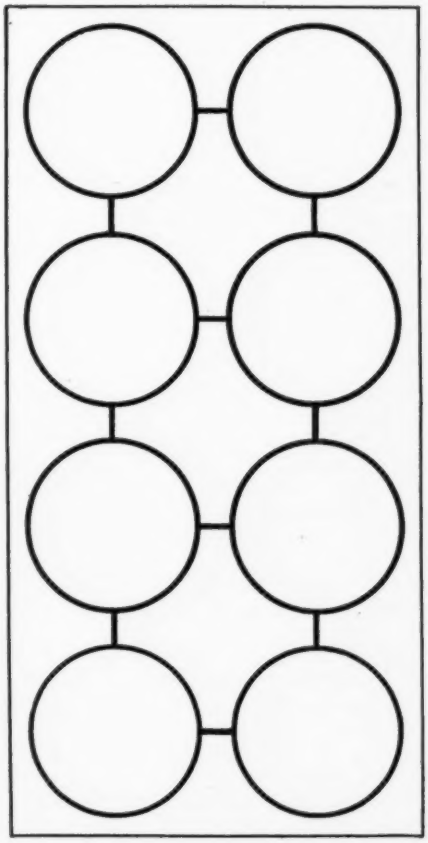
Bin Interstices Provide Additional Storage

AT the Triangle Rock and Gravel Company's plant near San Bernardino, Calif., corrugated (sectionalized) steel bins are used. There are eight of these bins holding about 60 tons each. For additional storage



Steel plate between corrugated steel bins provide interstice bins for additional storage

space, the eight bins have been separated about 30 in., and a suitably braced steel plate mounted vertically to block off the 30-in. space. The corrugated culvert pipe sections, making up the bins, are in bolted sections, and are of 10-gauge steel. The interstices give three additional storage spaces, each holding about 40 tons of material.



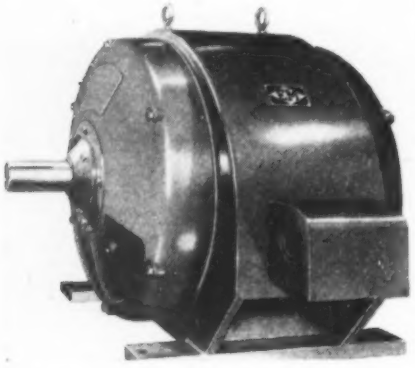
Plan view showing how steel plates between circular steel bins provides additional storage

Improvised steel bins made from old steel hopper cars

new MACHINERY

Induction Motor

ELECTRIC MACHINERY MFG. CO., Minneapolis, Minn., has developed heavy-duty squirrel cage induction motors for large power drives from



End view of drip-proof squirrel-cage induction motor

100 to 1000 hp., 1800 r.p.m. and lower speeds, which are of drip and splash-proof construction.

A fabricated steel frame shuts out falling particles, and is said to make operation quieter and invite easier cleaning. Inspection and blowng out is simplified on larger ratings with access plates designed for speedy removal and replacement. Sealed bearings can be cleaned and refilled without motor disassembly. Double end ventilation is provided by a blower on each end of the rotor. Starting characteristics are NEMA Class B (normal torque, low starting current) for across-the-line starting.

Shovel Has Smooth Controls

THE OSGOOD CO., Marion, Ohio, has announced its Type 71, 1¼-cu. yd. machine, with air controls. It is available in both crawler and wheel mounted models. The Model 710 on crawlers may be obtained as a shovel, dragline, clamshell, crane, backhoe, and other combinations and is readily interchangeable. The Model 715 Mobilcrane is a pneumatic-tired, one engine, one-man-operated material handler. All models are equipped with air control and air-cushion clutches.

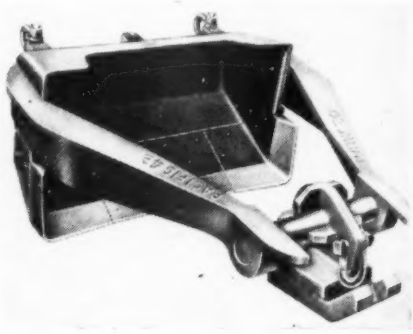
A new method of power application in the power shovel field is to be found in the air-cushion clutch, providing smoother operation. It has only one working part, which requires no adjustment, reducing maintenance time and operating costs to a minimum. On the Model 710, the clutches for traveling and steering are operated by air. By means of a patented rotary coupling, air is taken down through the vertical travel shaft to the brakes and clutches used for steering and traveling. Thus, the machine can be steered without stopping the forward motion of the machine, and with the cab in any position over the trucks.

A swing brake, operated by air, is mounted on the horizontal reversing shaft, allowing the operator to spot his load accurately and speedily. An automatic swing lock is engaged when the swing clutch is disengaged.

The standard boom hoist unit is operated by air, through the swing and travel reversing clutches. Final drive is by worm and worm wheel for safety. Other safety features include an automatic brake band on the worm shaft, and a pawl for positive locking of the boom. An independent boom hoist unit may be provided, which is powered from the hoisting gear and controlled by two twin disc clutches.

Drag Scraper

ALLOY STEEL & METALS CO., Los Angeles, Calif., has developed a line of drag scrapers for haulage and transfer operations in mines, quarries and sand and gravel plants. One of the features claimed for the Pacific drag scraper is that it is "balanced" so that the entire weight of the scraper goes into the digging action. When the scraper is loaded, digging action ceases, relieving the scraper hoist of excessive power requirements. On the back haul the scraper tips back on runners, lifting the cutting blades above digging level, relieving blades of wear. In place of horizontal blades, these scrapers are provided with self-sharpening corner cutters designed for more effective digging action. The shoe, attached to the front of the harness, is made of a tough, wear-resistant manganese steel which bal-



Drag scraper of heavy construction

ances the scraper and protects harness and cable shackle from wear.

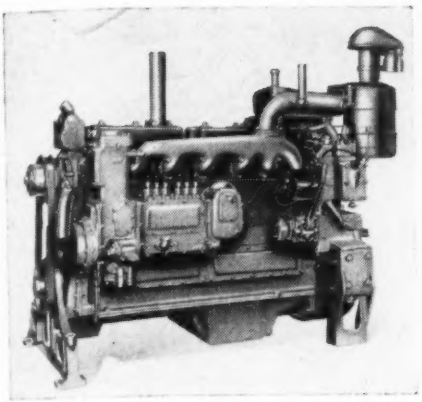
The drag scrapers are available in three models and sizes: Model A in 26-in. and 30-in. sizes; Model B in 36-in. and 42-in. sizes; and Model C in 48-in. and 60-in. sizes.

Improved Diesel Engines And Tractor Models

CATERPILLAR TRACTOR CO., Peoria, Ill., is now in production on two new Diesel engines and two Diesel track-type tractors powered by these engines, including the four-cylinder D315 and the six-cylinder D318 engines and the D4 and D6 tractors.

The D315 engine replaces the D4400 engine and the D318 replaces the D4600 engine, providing one-third greater power output than the previous models. The D315 engine has a maximum output, with radiator fan

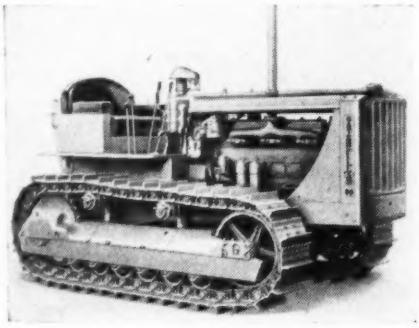
Dragline with air controls has power transmitted from engine to reversing shaft by roller chain



Diesel engine, 6-cylinders, 104 hp.

and full equipment, of 70 hp., while the D318 is similarly rated at 105 hp.

With the D6 tractor developing 65 drawbar horsepower and 75 belt horsepower, this is an increase of 10 hp. over comparable figures for the previous model; while the D4 tractor, with 43 drawbar horsepower and 48 belt horsepower, a 20 per cent in-



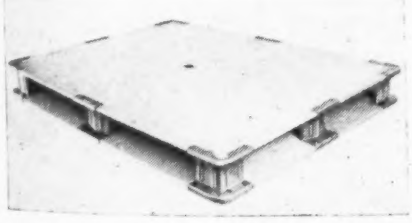
Diesel-powered tractor develops 65 hp. at the drawbar, 75 hp. at the belt

crease in work power is offered over the model it replaces.

Other new features include: oil pressure control system to assure maintenance of proper oil pressures at bearings even under extreme cold weather starting; fuel injection valve design, permitting easier servicing; governor equipped with anti-friction bearings; solid aluminum alloy main and connecting rod bearings.

Pallets for Lift Trucks

CLARK TRUCTRACTOR DIVISION of Clark Equipment Co., Battle Creek, Mich., has announced that it is now in production on a durable pallet made of ⅝-in. plywood decks and posts of plywood blocks or metal. It



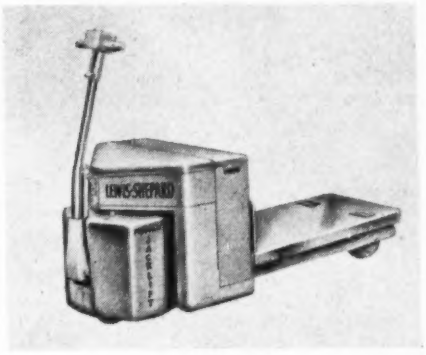
Pallet for fork lift truck

is double-faced, designed for four-way fork entry, and is furnished in the metal-post construction for use with hand-lift or motorized pallet trucks.

It is offered in sizes ranging from 30- x 40-in., with 2-in. vertical clearance, weighing 36 lbs., up to 48- x 60-in. with 3¾-in. clearance, weighing 89 lbs. Capacities are 4000 lbs. carrying load, and 16,000 lbs. static.

Power Jack Lift

LEWIS-SHEPARD PRODUCTS, INC., Watertown, Mass., has designed a new Power Jacklift which is an electrically

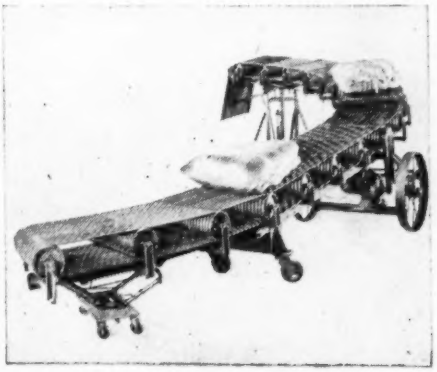


Electric lift truck

operated hand lift truck with complete electric button operation located in the handle head. If the handle is released, an electric brake will instantly stop the truck in its tracks. In the vertical position or when lowered, the handle has a steering arc of 200 deg.

Flexible Portable Conveyor

E. C. HORNE MACHINERY CO., Denver, Colo., has developed a portable conveyor, known as the Flexoveyor, which is flexible and reversible. An electric motor driven, multiple endless



Conveyor operates around curves

steel spring, operating over 6-in. diameter grooved steel rollers at 20-in. intervals, compose the conveying medium on this conveyor. It provides a rapid movement of units not heavier than 200 lb., around curves up to 90 deg., and it will operate at a maximum incline of 12 deg.

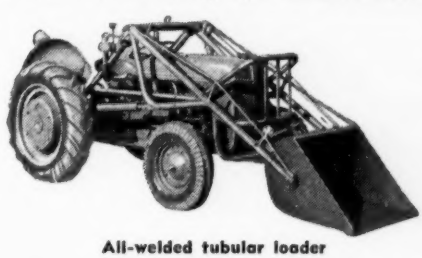
The conveyor is supported by swivel castors which permit easy movement of conveyor in or out of box cars or to any point in the plant where needed. Head end and tail end are adjustable in height while the unit is in operation. It is said to be particularly effective in moving bags or cartons to and from box cars and trucks.

Standard conveyors are 20 in. wide and 26 ft. 8 in. long. The capacity is about 1500 bags per hour. The conveyor is powered by a 1-hp. gear motor, with a reversing switch, through a roller chain drive to the middle roll of the conveyor.

Hydraulic Loader

LOADTRAC CO., Chicago, Ill., has developed a hydraulic loader, known as the Loadtrac, as an attachment for the Ford-Ferguson tractor. Its design is said to enable the greatest hydraulic force to be exerted at the "breaking-out" position at which it will lift 2000 lbs. and sustain, at a height of 8½ ft., 1000 lbs. It raises to this height in five seconds and lowers to the ground in four seconds.

The design transfers loading thrust to the rear wheels through horizontally mounted cylinders removing any strain from the tractor itself. A built-in, self-contained, hydraulic system provides instant, finger-touch control with power derived from a heavy-duty, low pressure 7½ g.p.m. pump driven continuously by a heat-treated



All-welded tubular loader

spline drive from the front of the crank shaft. Loader operation is continuous as long as the engine is running, without regard to the clutch position. The frame of the Loadtrac serves as a reservoir for 5 gal. of hydraulic fluid, independent of the tractor's hydraulic system.

The loader, of tubular all-welded construction, is mounted to the tractor in front by the installation of a special axle hinge pin to which the front of the loader is attached. In this manner, the weight is placed directly from the loader to the axle as well as maintaining alignment between the pump and the crankshaft.

Electrode for Cast Iron Weld

AIR REDUCTION SALES CO., New York, N. Y., has developed Airco No. 375 electrode for machinable welds on cast iron. This is an electrode with a high nickel core wire and a heavy extruded coating which may be used on either a.-c. or d.-c., and is available in 5/32 in. and ⅛ in. diameters. Later it is planned to add 3/32 in. and 3/16 in. diameters.

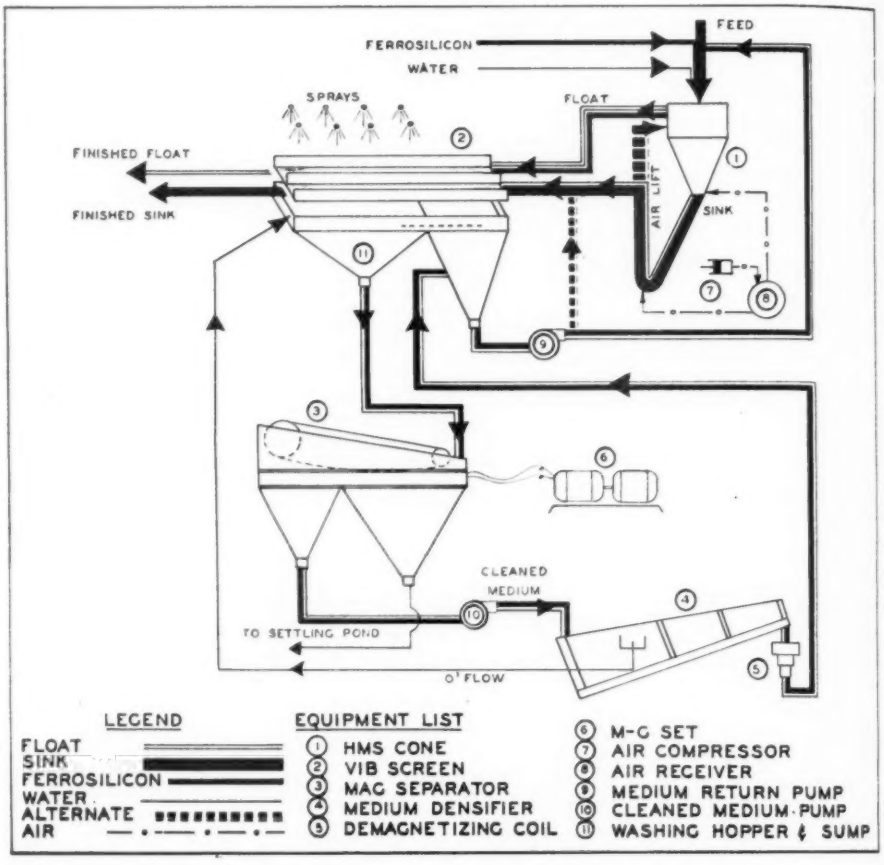
Semi-Portable "Sink-Float" Plant

Western-Knapp Engineering Co., San Francisco, Calif., has developed a semi-portable "sink-float" plant [having capacities in the 15 to 25 tons per hour range] which is of considerable interest to the rock products industries. They have named it the "Mobil Mill."

Those who have had the opportunity of seeing this process in operation are reported to be very enthusiastic about its possibilities because the operating costs are within the limits necessary for its use in such low-priced materials as sand and gravel, and the process essentially is very simple. The semi-portable plant, developed by Western-Knapp Engineering Co., can be purchased outright, or rented on a monthly basis. Thus anyone who wants to try out the plant as a pilot operation can do so without a large expenditure.

Western-Knapp Engineering Co. has designed and constructed many of the sink-float plants (Heavy Media Separation) in the United States, some of which handle relatively large hourly tonnages. This new "Mobil Mill" is smaller but is complete, compact, and designed for variable operating conditions, and is said to be ideal for a pilot plant or for a commercial plant where the tonnages handled are as above prescribed.

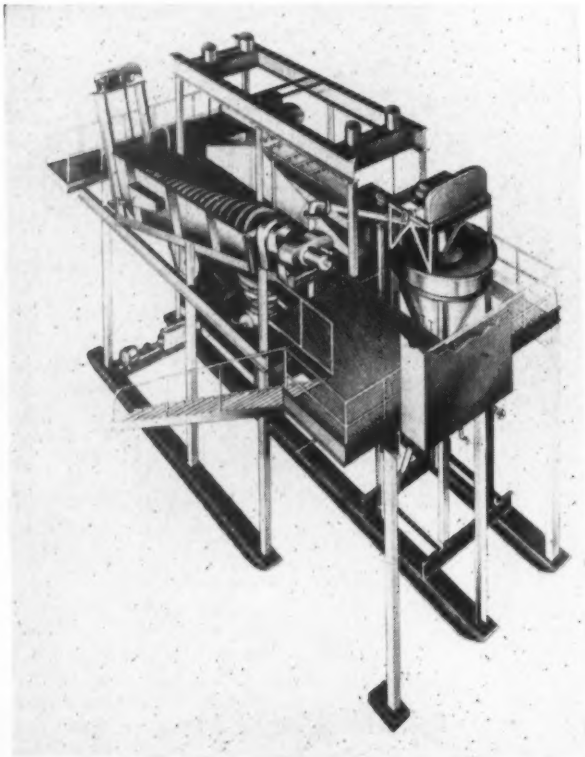
The Heavy Media Separation Process (HMS) or the "Sink-Float" process is very simple in its application and can best be described by mentioning a very possible application in the sand and gravel field; that of removing water-logged wood chips from the aggregate. Coal, clay balls, shales, chalcedony or other opaline minerals and other deleterious materials could just as well be used as illustrations as they are all well within the realm of possibilities.



Flow sheet of the semi-portable "sink-float" plant

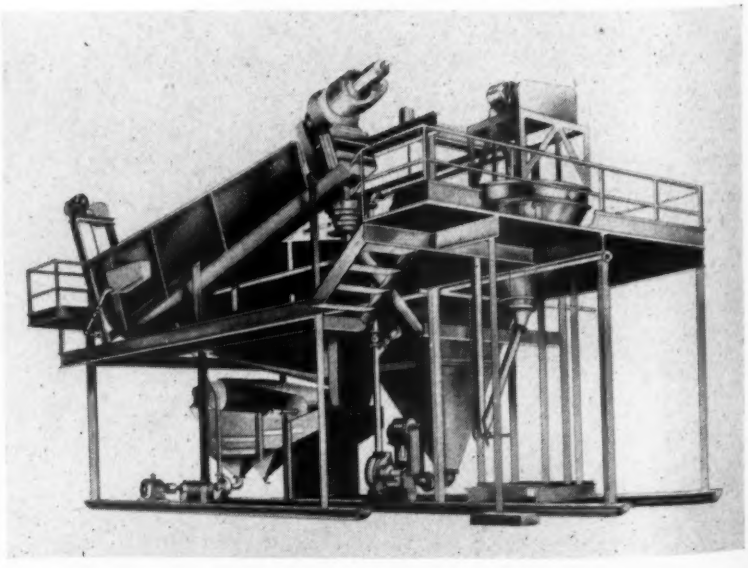
First, a liquid media is prepared by grinding ferro-silicon* to about 100-mesh with water. This pulp is diluted to any pre-determined specific gravity. The solid particles do not settle out as easy as one would suppose. In fact the pulp could be said to be

*Magnetite, galena can also be used.



Left: Looking down at "sink-float" plant. Separating cone to the right, followed by screen and washing hopper. To the left is the screw densifier.

Below: Under-water magnetic separator for recovery of the ferro-silicon flotation media may be seen to the left



"homogenized." If this pulp is diluted to a sp. gr. of 2.0 ordinary gravel will sink in it and the water-logged wood chips would float off, for the gravel has a sp. gr. of 2.65 and the chips (estimated) 1.0 to 1.5. Essentially this is the sink-float process. Its application is almost as simple.

In the "Mobil Mill" the crushed material (usually with fines removed) is fed to a cone containing the high gravity media. The portion that sinks is removed by an external type, air lift. Agitation of the pulp in the cone is effected by stirring arms mounted on a vertical drive shaft. The agitation is purposely not violent. The float product in the cone is removed by overflow displacement through a tangential launder. Both the sink and the float products then pass to individual, specially designed vibrating screens that operate wet. The screens are to remove the adhering ferro-silicon media from the products. Ferro-silicon costs in the neighborhood of 5¢ per lb. The amount used per ton of material treated runs from 0.1 to 0.4 lbs. After washing on the screens the sink (and the float) products have completed the cycle; the gravel can be shipped and the water-logged chips discarded. The balance of the process deals with the recovery of the ferro-silicon washed from the two separated constituents.

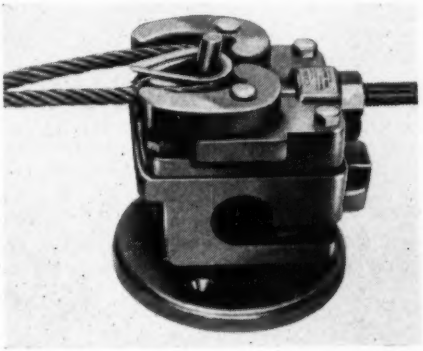
The wash waters from the vibrating screens with ferro-silicon and fines first pass to a wet operated magnetic separator. This consists of a stationary curved bank of magnets sloping upwards. A conveyor belt passes just under the magnets which are submerged in water. Magnetic particles are attached to (and through) the belt and carried to the discharge end. Non-magnetic materials sink and are rejected. The magnetic materials then pass via a rubber lined centrifugal pump to the medium "densifier." The "densifier" resembles a spiral classifier and is used to de-water the cleaned magnetic separator concentrate, as a storage reservoir, and as a conveying and feeding unit to return the media to the separatory cone. Before passing back to the separatory cone, the discharge from the densifier passes through a bank of de-magnetising coils. The coils that are used on the Mobil Mill flow sheet are to prevent flocculation. It will be realized that the materials that have gone through the magnetic separator may be strongly magnetized and this would tend to flocculate the fines in the separatory cone. The de-magnetising coil easily removes this hazard.

So far the heavy media separation [HMS] process has been used on coarse materials (2½-in to ⅛-in.) but by modifications, material in the plus 48-mesh can be handled.

The Mobil Mill is so constructed and designed that it can be assembled on the job by six men in about six days. The Western-Knapp Engineering Co. is a division of Western Machinery Co. of San Francisco, Calif. Users of the HMS process are required to pay a very small royalty to the owners of the basic patents. The amount of these royalties are usually based on the value of the commodities treated and are well within reason.

Wire Rope Loops

THE NUNN MANUFACTURING CO., Evanston, Ill., makes a vise which forms a loop in wire rope by simply turning one hex nut with an ordinary wrench. The vise automatically compensates for rope sizes within its designed range.

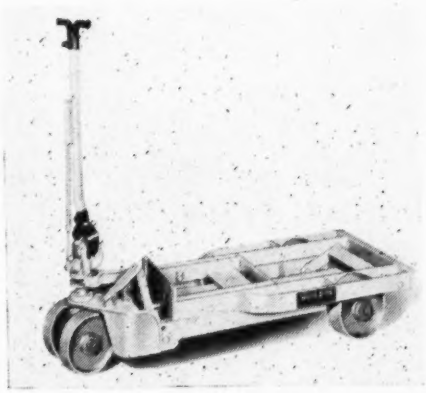


Vise with swivel base to form wire rope loops

Hydraulic Lift Truck

THE WEST BEND EQUIPMENT CORPORATION, West Bend, Wis., is offering a heavy-duty hydraulic lift truck in its Weld-Bilt line which has a lifting capacity as high as 10,000 lbs., according to the manufacturer.

Designed in three models, in narrow as well as wide styles, this truck has patented front-wheel equalizers that keep the truck platform level regardless of the bumps or other minor obstructions in the path of the truck. The hydraulic lift unit is horizontally mounted, and the lifting mechanism, wheels, and frames are all of heavy construction. Moving parts are equipped with ball or roller bearings for easy handling. The steel frame is completely arc-welded and cross-braced.



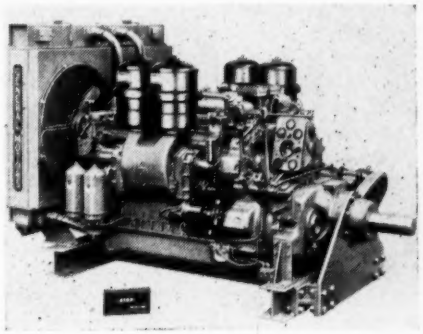
Heavy-duty hydraulic lift truck

Improved Diesel Engines

DETROIT DIESEL ENGINE DIVISION, General Motors Corporation, Detroit, Mich., has brought out improved models of its Series 7, Twin 6, Diesel engines.

Each Twin unit is made up of two basic 6-cyl., 2-cycle engines mounted side by side and geared to a single shaft. Units are offered with either right or left-hand rotation. Continuous BHP at 1800 r.p.m. is 276 with a maximum intermittent rating of 400 at 2000 r.p.m.

A variety of power take-off arrangements are available, including four different transfer gear types: the heavy-duty power take-off designed to take pulley and chain drive side thrust without the need for a special cradle-mounted sheave or sprocket; the stub shaft type for various types of couplings encountered with heavy duty machinery; the drive flange type for installations where the driven machinery is to be connected directly to the power unit; and the S.A.E. "O" size housing designed to support any close coupled power take-off within the proper horsepower range with particular attention to application with torque converters. Gear ratios of 1:1 direct drive, and 1.33:1, 1.77:1, and 2:1 reduction are available with each of the four types.



Twin Diesel engine with heavy-duty type power take-off

Engine units can be obtained with either radiator or heat exchanger cooling systems, depending upon the nature of application. Throttle controls have improved bearing areas. The battery charging generator, tachometer drive, and accessory drive are all connected to the gear box thus enabling them to function when either of the two engines in the unit is not in operation. Dual electric starting motors are obtainable as optional equipment.

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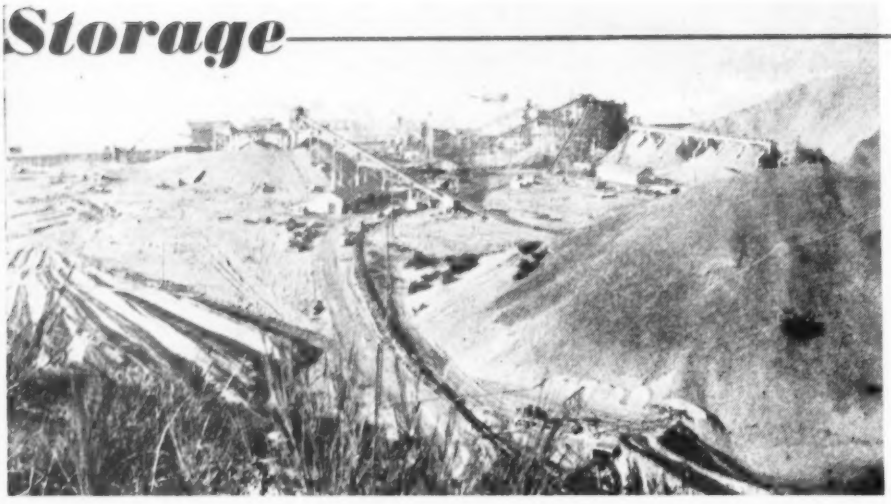
R. G. LETOURNEAU, INC., Peoria, Ill., announced recently that the 5000th Tournapull had come off the production line. This model is part of a complete line of electrically-controlled Tournapulls.



Overall view of plant showing docking facilities in the left background with screening plant and finished storage open bins to the right

Pioneer Sand and Gravel Co., Seattle, Wash., constructs new reinforced concrete storage facilities, comprising 20 bin compartments with a long reclaiming belt conveyor system

By W. B. LENHART

Shipping Million Yards By Barge-Rail

CONSTRUCTION of the finished material storage section of the Steilacoom, Wash., plant of the Pioneer Sand and Gravel Co., whose headquarters are at the foot of Fairview Avenue in Seattle, was discussed in a previous article. The plant, one of the largest in the Pacific Northwest, is constantly being changed to meet new conditions and several interesting innovations have been adopted during the past year.

The "Pioneer" pit, as it is locally referred to, is in itself quite a novelty: practically no oversize greater than 3 to 4 in. with a surprisingly well balanced mixture of smaller sized gravel and sand, all of glacial origin and deposited in a huge moraine structure covering a great area, which at this pit is recovered from a single bench about 250 ft. high. To date the pit has produced some 17,000,000 cu. yd. of aggregate with material in sight for a life time. During the past 12 months the shipments have been very close to 1,000,000 cu. yd. The pit run material is clean and free from deleterious materials.

New Raw Storage Unit

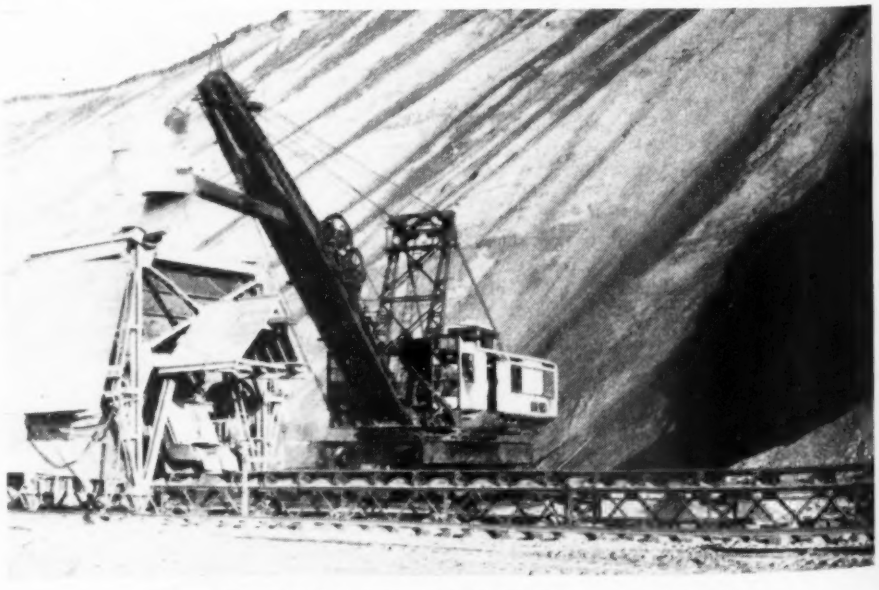
To smooth out the operating features of the plant the company last year completed and placed in operation a new raw storage unit of reinforced concrete. This section of the plant replaced a wooden structure. The pit material is delivered to the raw storage section by belt conveyors inclining up to No. 1 scalping screen (vibrating) where the plus 2½-in. material falls to a horizontal 24-in. belt that acts as a stacker belt and delivers to a second surge or raw storage pile ahead of the crushing section of the plant. The minus 2½-in. materials fall to the raw storage section ahead of the wet gravel screening section. The entire assembly is built up on cylindrical concrete pillars, and is a very serviceable and neat looking piece of construction. The platform supporting the scalping screen is 56 ft. high. Raw storage section has a live capacity of about 10,000 cu. yd.

As all the finished products from this plant are shipped by barges or by rail, it is not economical or practicable to have ground storage piles unless the ground storage can be quickly reclaimed by belt conveyors. There are no ground storage piles like many Pacific Coast plants where shovel or dragline units reclaim. Therefore, at this plant, if the bins are full, either the plant must shut down or ship. To further smooth out the operation, the company started on a program of additional finished material storage facilities. To date there are 10 compartments completed and in operation, each holding 800 to 1000 tons (depending on the material), and at this writing 10 additional compartments are under construction. The 20 compartments will be built in a single line with a long, 30-in. reclaiming belt under the assembly for barge loading. The walls separating each compartment are of novel construction, and were described in the previous article.

When the 20 compartments are completed, the screening section of the old plant will be moved on top of the first four compartments, making it essentially a new screening plant.

Provisions for Both Barge and Car Loading

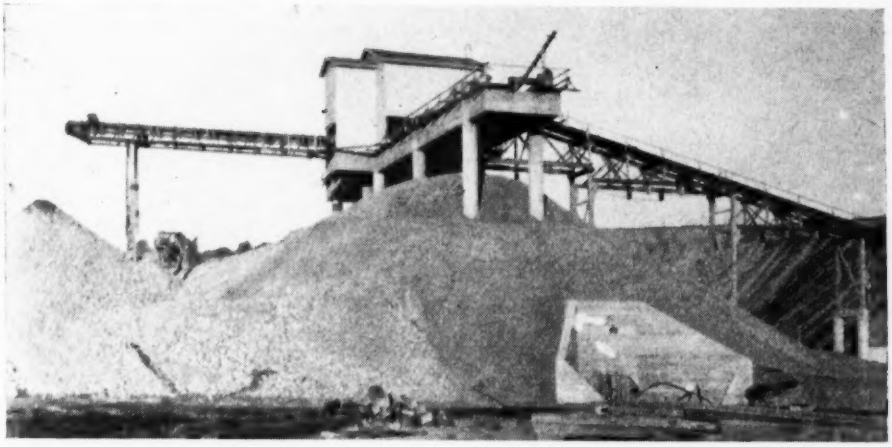
At present the No. 3 crushed rock and washed gravel screens are mounted over laminated wood bins. Under the bins are two shorter reclaiming belts. The third longer belt passes



Surge hopper feeding conveyor being loaded by 5-cu. yd. shovel

under these bins and also under the new storage units. These three belts are all parallel to each other, with the two shorter belts discharging to a short shuttle conveyor that delivers to the longer (barge loading) belt. This shuttle is also reversible and can discharge to an inclined belt used for car loading. Or the shuttle can be moved forward on rails and unload to a fifth 30-in. belt conveyor outside the bins. This conveyor elevates and delivers the processed rock back to the new storage compartments. This belt which discharges to a short cross belt and then to a long 24-in. belt over the compartments, is unloaded by a Link-Belt, traction moved, unloader that rides rails over the assembly. This section is so designed that cars can be loaded at the same time that barges are being loaded. The latter can be loaded at 500 t.p.h. A standard gauge gondola can be loaded in 6 to 7 minutes. The drawing shows how this group of reclaiming belts is assembled, and how the 20 new compartments will relate to the balance of the plant.

In the pit a 30-in. belt conveyor, 1000 ft. centers, is mounted temporarily parallel to the high face of the deposit. Two men work midway up this face with 18-ft. poles and "pole down" the face sufficient to eliminate caving hazards. A 5-cu. yd. Marion, all-electric, shovel loads to a movable hopper over the belt, the hopper having a belt feeder delivering to the long belt. The shovel takes an 18-ft. slice for the entire length of the belt, thus about 170,000 cu. yd. of material are moved before the shovel takes another slice. The long belt delivers to a second 30-in. belt, at right angles to the first, which delivers to the raw storage assembly, previously described.



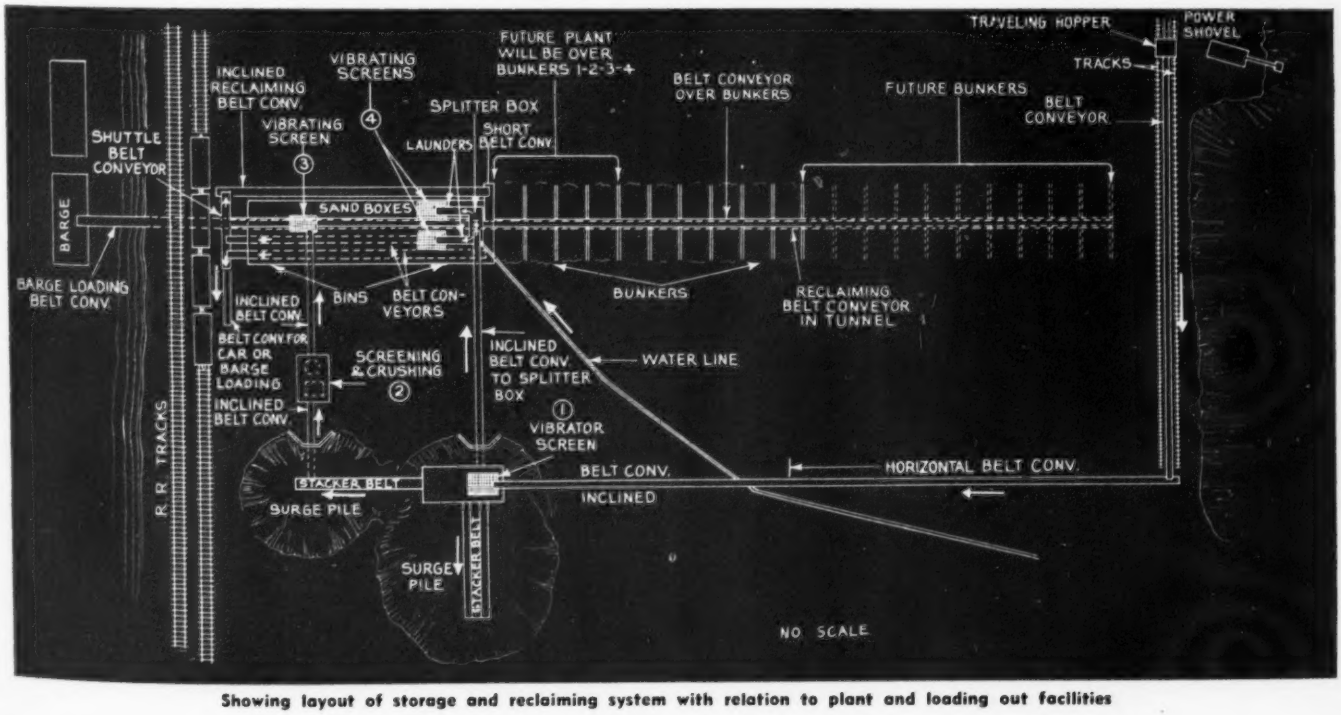
Reserve storage for either rail or barge shipment with reclaiming conveyor below. Note the excellent reinforced concrete conveyor structure with shuttle conveyor above

From the minus 2½-in. raw storage pile, material is fed to an inclined 30-in. belt by a Link-Belt feeder. This belt conveyor moves the material to the top of the plant where it meets a heavy stream of fresh water at a splitter-box where the aggregate is split into two equal portions and flows through a launder to two identical sets of wet operated vibrating screens, No. 4. The top screen is a two-deck, 4- x 12-ft. screen, and at the time of inspection had ¾-in. and ¼-in. mesh cloth. The lower screen is also a double-deck unit but is 4- x 10-ft. with 1½-in. and 1-in. mesh cloth. The size of wire used naturally is changed to meet the customers needs. All vibrators are Tyler screens. Water is delivered to the plant by one of two Bingham pumps that deliver 2700 g.p.m. against a 90-ft. head and at 45-lbs. pressure. The water reaches the plant through 1500-ft. of 16-in. steel pipe.

The minus ¼-in. material passes to a series of large sand boxes that have been in use many years, and previously described in these columns. In the first box a fine, heavy, sharp engine sand is produced. Paving sand, building and superfine sand are produced successively in the three remaining boxes. The overflow goes to waste.

The plus 2½-in. material is drawn from its surge pile by a reciprocating feeder that delivers to an inclined belt serving a 2-ft. 4-in. Traylor jaw crusher (No. 2) that acts as a primary crusher. There is no large rock. The primary crusher discharges to a vibrating screen and the oversize goes to a 4-ft. Symons cone crusher. The cone crusher operates in closed circuit with the screen via a small bucket elevator. The Traylor crusher is set to ½-in. to 1½-in., depending on requirements, and the mesh of the

(Continued on page 80)



Showing layout of storage and reclaiming system with relation to plant and loading out facilities

SALES PROMOTION
Builds Up Future Markets

Richland Lime Co. increases production from 100 tons per day of agricultural limestone and concrete aggregates to 150 tons per hour to meet rapidly growing demands for its products

SALES PROMOTION, by newspaper advertising, personal contact, and emphasis on service to customers supplementing the AAA Government program, has built a substantial market for agricultural limestone for the Richland Lime Co., Pulaski, Tenn. This policy of intensive merchandising in conjunction with and in addition to the AAA program has necessitated the revamping of the plant and equipment additions to far surpass a plant capacity of 100 tons per day which was ample in 1940 at the time the plant went into production. An increase in production from 100 tons per day to 100 tons per hour and a projected further increase to 150 tons per hour is indicative of how rapidly the market has grown.

The plant features a dual-arrangement, actually two plants in one, with a stockpile built up by the first plant to provide feed for the second. This arrangement permits independent operations of the two plants, as a reserve against enforced shutdowns.

While about 97 per cent of agstone sales are on a delivered and spread basis, there are times when the seven company-owned spreaders cannot serve all of the customers on schedule. Four Marvel spreaders are available that can be attached to the back of a truck or tractor, when occasion demands, to continue giving good service.

Advertising

One of the more successful methods of promoting sales is the insertion of weekly advertisements in the local newspaper. A typical advertisement run in the Pulaski "Citizen," the local paper which reaches farmers in the county is illustrated herewith. Direct personal sales contact has been a potent factor in promoting sales. Company records have shown that the personal contact sales by company officials as well as a salesman have meant as much as 10,000 additional tons sold in 1945. The salesman is paid on a flat commission basis for all stone that is sold due to his contacts.

Jack McCall

Sales on AAA Contracts

Agstone sales in Giles County are made on AAA contracts on a delivered and spread basis for $3.25 per ton, or on an F.O.B. plant basis for $2.65 per ton. A small per cent of the total is shipped to adjoining counties by both truck and rail. Stone (97 per cent) is delivered by a fleet of 19 Ford and Chevrolet trucks, and at times hauling is contracted when deliveries cannot be handled by the company-owned fleet.

Quarrying

Quarrying stone from a 10-acre area, this company is working an 18-ft. stratum, with an almost unlimited supply below the present quarry. Overburden, averaging 2 ft. in thickness, is stripped by a No. 45 Lorain Diesel shovel with a ⅞-cu. yd. bucket. This shovel is also used to load trucks. Holes are drilled by an Ingersoll-Rand pneumatic wagon drill with a 70-lb. hammer, served by an Ingersoll-Rand 210 c.f.m. air compressor. The holes are drilled to the 18-ft. depth, and are spaced 4 ft. apart with a 4-ft. burden. The holes are filled to within 3 ft. of the top with 60 per cent gelatin dynamite, which yields about 25 tons per hole. From 150 to 400 holes are shot per blast. Secondary breakage, which is very light, is done by jack hammers.

Plant Operations

Plant layout is compact and efficient, with the two previously mentioned independent plants operating in conjunction with one another. Stone is sent either to bins from the first

Two samples of typical newspaper advertising which has been very effective in the promotion of agricultural limestone

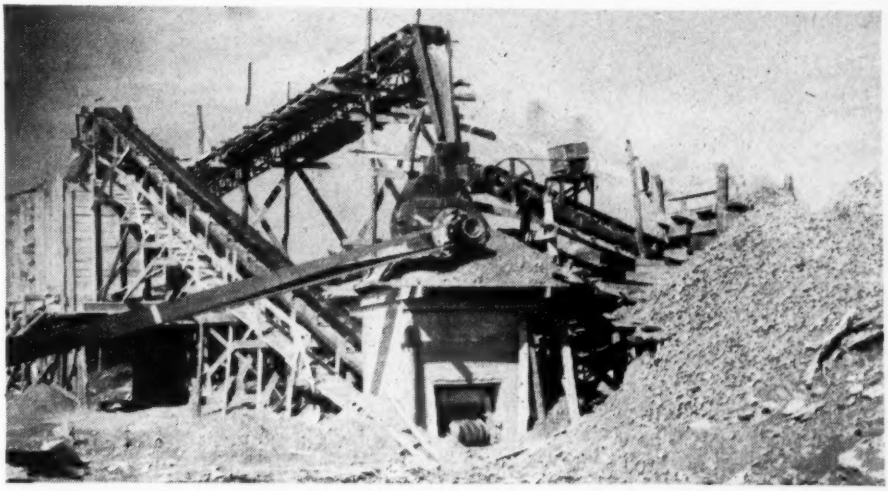
plant or to a stockpile for feed to the second plant.

Stone is transported from the quarry by four 1½-ton Ford trucks with 3-cu. yd. bodies, a distance of about ⅛-mile to the primary crusher. Discharge is to a hopper, with a 3- x 12-ft. Pioneer roll feeder governing the flow into a 20- x 36-in. Pioneer jaw crusher, set at an opening of 6½-in. Crusher throughs are conveyed by a 30-in. Pioneer belt conveyor, 76 ft. centers, to a 4- x 8-ft. double-deck Seco screen. Square openings on the upper and lower decks are 3½- and 1-in. respectively. Oversize is recrushed by a No. 70 Day pulverizer; the 3½- to 1-in. stone and the product from the crusher are elevated by a 24-in. belt conveyor, 90-ft. centers, to a 3- x 8-ft. triple-deck Seco screen; and stone passing the lower screen is chuted into a 100-ton capacity bin as a finished road rock.

The Seco screen has ¾-, ¼-in. and 8-mesh openings on the three decks, respectively. Oversize is conveyed by an 18-in. belt conveyor to a stockpile, stone retained on the ¼-in. deck is sent to a 100-ton capacity bin as concrete stone or oil rock, stone retained on the 8-mesh is returned in closed circuit to the Day pulverizer by an 18-in. horizontal belt conveyor, and fines passing the 8-mesh is sent into a 100-ton capacity agstone bin.

Second Plant

Under the stockpile, which provides feed to the second plant, is a recovery tunnel, 30 ft. long. It houses a 18-in. Pioneer belt conveyor, 60-ft. centers, that conveys stone fed to the belt by a 6- x 6-ft. Pioneer feeder from the stockpile. The belt discharges into another No. 70 Day pulverizer, which in turn sends crusher throughs to a 24-in. Pioneer belt conveyor, to a 3- x 8-ft. Pioneer triple-deck screen. The screen has 1-, and ¼-in. sq. openings on the two upper decks and 8-mesh screen cloth on the lower deck. The product retained on the upper and lower deck is returned to the pulverizer by a 24-in. Pioneer horizontal belt conveyor, the ¼- to 1-in. stone goes to a 100-ton capacity bin as concrete stone, and material passing the lower deck is chuted to a 100-ton capacity bin as agstone. Flexibility of operation allows material from any or all decks to be returned to the pulverizer in the event that additional agstone is desired. At present, about 60 per cent of production is road stone. During 1945, 14,798 tons of agstone were produced, with as much as 4000 tons sent to other counties.



General view of main crushing and screening plant

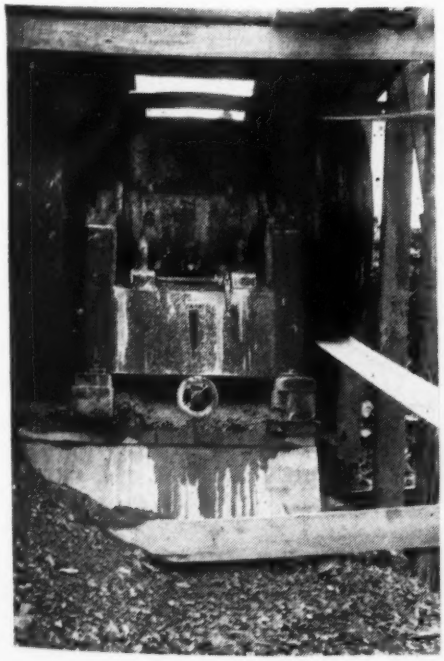
Grate Bars Removed

It is interesting to note that the grate bars in the two Day pulverizers have been removed, to prevent the breakdown that would otherwise occur when tramp iron gets in the machines. With the removal of the grate bars, large pieces of iron have gone through with no apparent injury to the hammers. Naturally, the product from the pulverizers is not ground as fine with the bars removed, but with the closed circuit system employed, it has been found more economical to return oversize stone to be recrushed than it would be to stop production and replace grate bars when the tramp iron enters and causes a breakdown.

Recent Additions

While the above operation produced as much as 100 tons per hour during the past few years, several changes and additions have been made recently to increase the yield to 150 tons per hour. A 24- x 42-in. Univer-

(Continued on page 109)



Left: Stone is crushed in a primary jaw crusher. Center: Pulverizer for the production of agstone. Right: Pneumatic wagon drill in quarry

"Laundering" Sand and Gravel Material To Produce A Clean Product

W. R. Bonsal Co., Inc., Lilesville, N. C., installs blade mill and sand classifier to obtain an unusually clean product

TO ELIMINATE SURGES and provide a more constant feed to the plant, the W. R. Bonsal Co., Inc., Lilesville, N. C., has installed new equipment and has changed from wet to dry preliminary processing of sand and gravel. In addition, a large blade mill was installed to assist in washing out the clay impurity that occurs in the deposit.

The new installation consists of a 36-cu. yd. capacity steel hopper supported on a concrete foundation, a 3- x 12-ft. Allis-Chalmers pan feeder with a Reeves variable speed reducer; a 30-in. belt conveyor, 100 ft. centers; a 5- x 12-ft. Tyrock double-deck screen; and a 7- x 14-ft. Allis-Chalmers blade mill.

Prior to the new installation in 1946, material from the pit was hauled in Western side dump cars part way and then sluiced to the screening plant. The time lag between dumping cars and waiting for the next train naturally meant that the plant was not in constant operation, with a resultant loss in production. With the present arrangement, a surge pile is built up at the discharge point where cars dump to a hopper or to the ground around the hopper providing a steady flow to the plant. Sand and gravel adjacent to the hopper is pushed into it by a tractor dozer. Under the hopper, the pan feeder, operating off the speed reducer, sends a uniform flow to the belt conveyor that moves material to the scalping screen located on an elevation higher than the main plant. This height was necessary to allow both sand and gravel to pass through flumes for further processing. Water is added in the flumes to permit the product to launder to the plant.

Blade Mill Breaks Clay Lumps

The belt conveyor discharges over the Tyrock screen, with 1½-in. sq. openings on the upper deck and 4-mesh screen cloth on the lower deck. The upper deck acts as a buffer for the lower deck as it takes most of the load and saves wear on the finer screen cloth. Sand passing the 4-mesh cloth is flumed to a 16-ft. Woods rake classifier with the addition of water in the flume. Water is also added at the screen through sprays. The product retained on both decks enters the blade mill, where just enough water is added to keep the pulp fluid. After processing in the mill, where clay lumps are broken up, the product discharges to a flume where water is added to sluice it to a 5- x 10-ft. double-deck Tyrock screen for preliminary sizing. The screen is equipped with 2- or 1½-in. sq. openings on the upper deck, dependent upon the size of aggregate to be produced, and 4-mesh screen cloth on the lower deck. Oversize crushed in a 3-ft. Symons cone is returned to the flume by a bucket elevator, 60 ft. centers with 18-in. buckets. The product retained on the lower deck drops to a 36-in. picker belt where clay balls, not disintegrated in the blade mill, are removed by an inspector, and the minus 4-mesh product is laundered to the rake classifier. An inspector is also located at the screen to remove clay balls.

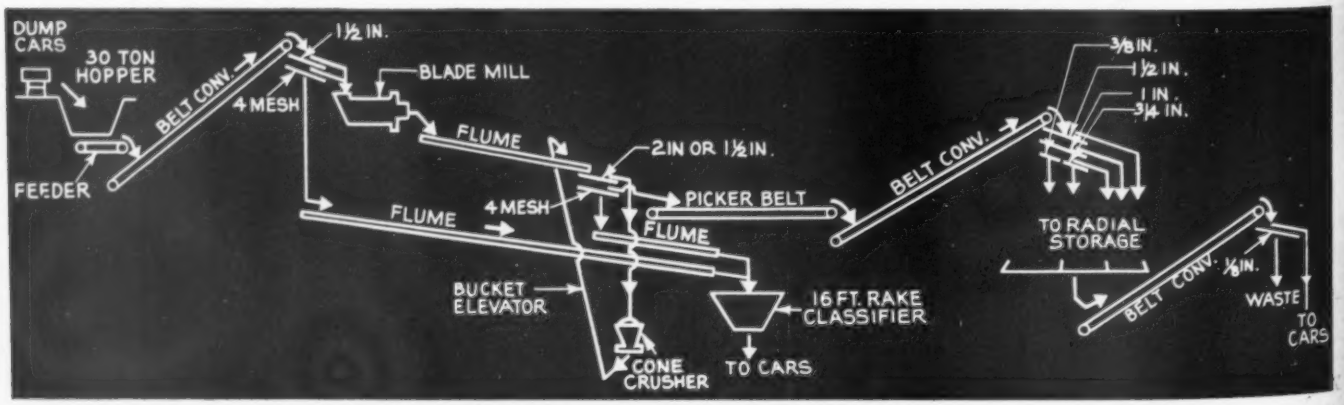
Discharge from the picker belt is to a 20-in. belt conveyor that elevates the product to a 4- x 12-ft. Allis-Chalmers Lo-Head triple-deck screen equipped with 1½- and 1-in. sq. openings on the two upper decks. The lower deck is split, with ⅜- and ¾-in. sq. openings on the upper and lower half, respectively. Sized products are placed in radial storage below the screens.

Storage System

Under the radial storage system, a reclaiming belt conveyor takes any desired blend and delivers it to a 4- x 8-ft. Link-Belt rinsing screen at the loading tipple. Washed material retained on the ⅛-mesh cloth is chuted to railroad cars and the fines are laundered to waste with the wash water.

Water is provided to the various points in the plant at a rate of 2750 g.p.m. by 5-in. and 8-in. Allis-Chalmers pumps. About 1500 g.p.m. is introduced to the flumes to wash the material to the main plant.

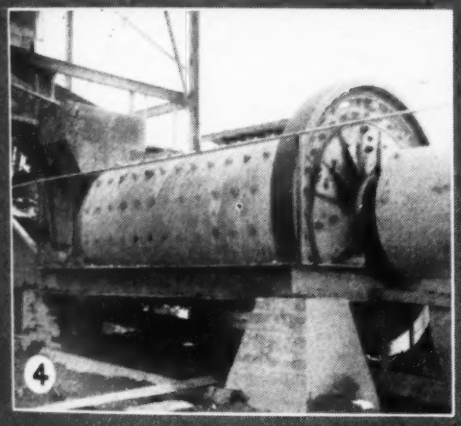
Two deposits are worked, each containing about two parts of gravel to one of sand. Overburden varies from 0 to 20 ft. and the depth of the deposits is from 15 to 45 ft. In the recoverable material, 10 to 15 per cent is clay, necessitating thorough washing in the blade mill as well as

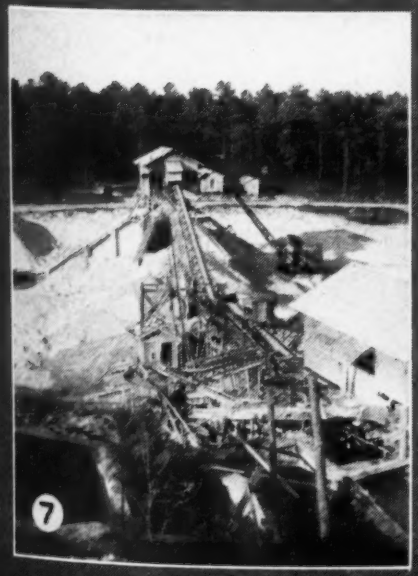


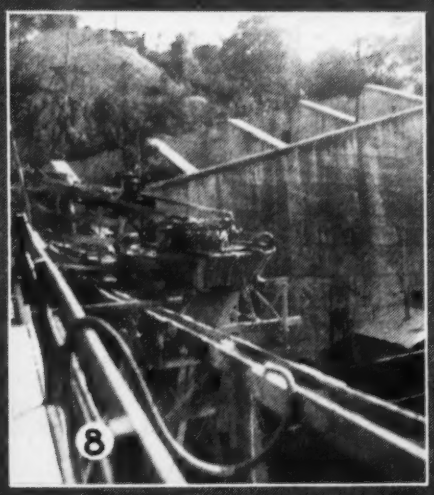
Flowsheet of wet processing of sand and gravel

Washing-Screening

Steps in processing sand and gravel: (1) Overall view of plant with material starting at blade mill, to the right, and gravel moved by belt conveyor to storage, to the left; (2) dozer moves material from side dump cars to hopper feeding belt conveyor to first step in plant processing; (3) side dump cars loaded at pit by steam shovel; (4) close-up of blade mill preceded by screen to scalp out sand; (5) showing flume which carries sand under blade mill; (6) looking down at main plant from final screening station; (7) looking toward gravel storage system from scalping screen at top of plant; (8) sand is recovered in rake classifier; (9) looking up belt conveyor from hopper to scalping screen. Note picker







having inspectors at the picker stations.

Overburden is removed by the same draglines that reclaim the deposit, a class 20 Bucyrus-Erie with a 2½-cu. yd. bucket and a class 24 with a 4-cu. yd. bucket. Sand and gravel, loaded in 8-cu. yd. Western cars, is taken to the plant, about one mile distant, by steam locomotives.

Produce Industrial Sand

The gravel in this deposit has an SiO_2 content of better than 97 per cent and much of it has been shipped to chemical plants in this country as well as foreign countries through the Southern Products and Silica Co., a subsidiary of the W. R. Bonsal Co., Inc. Total capacity of the plant is about 2000 tons per day of both sand and gravel.

W. R. Bonsal, Jr., is president of this company, F. J. Cloud is vice-president, R. L. Ellerbe is secretary-treasurer, and H. A. Ward is superintendent.

Shipping Million Tons

(Continued from page 75)

screen is also changed as demands require. The minus material from this screen is elevated to a double-deck screen, No. 3, over the crushed rock section. Screens can be changed as need demands and the products can be either washed or screened dry. In either case the fines are sent to waste.

The company has a fleet of eight barges that hold from 400 to 650 cu. yd. and two Diesel tug boats, the *Anne W* which can handle two barges and the *Service*, one barge. They make the round trip to Seattle in about 22 hours.

In Seattle the company has three strategically placed ready mixed concrete plants. One at the south end of Seattle on the Duwamish Waterway, one at the north end of Lake Union, and one at the main yard at the south end of Lake Union. At the latter yard the company has its general building material headquarters, and handles a total of 353 items, among which are Tru-Mix concrete, sand and gravel, non-slip aggregate, plaster sand, white sand, mortar sand, garden and lawn sand, roof coating, lime, gypsum and cement products and other items.

Gordon N. Scott is president, N. E. Johanson is vice-president in charge of operations; George Christensen is superintendent at Steilacoom and H. A. Lithgow, assistant superintendent.

Rotary Kiln and Crushing Research Studies

SEVERAL interesting research studies have been announced by Allis-Chalmers Manufacturing Co. Experiments were made during the year to study the transfer of sensible heat from kiln exit gases to a dry, sized feed suitable for kiln operation and to determine the applicability of heat exchanger principles when employed to increase the thermal efficiency of dry process rotary kilns by preheating the kiln feed. Tests are also being made to determine the optimum amplitude and the frequency of vibrations best suited to increase settling rates of finely ground inorganic materials in liquid suspension, while wet grinding of ores in rod mills was studied from sample and plant operating data obtained from 12 companies in the United States and Canada, using wet open-circuit rod mills in their grinding circuits ahead of ball mills. The *Review* also reports a heavy demand for cement-making machinery for foreign markets, including kilns and coolers being supplied for the expansion of a pozzolanic cement and mortar plant and for extension to a cement plant, both in Mexico, for an extension to a Casablanca, French Morocco wet-process cement plant, and for a new two-kiln cement plant near Medellin, Columbia.

Big Tripoli Demand

NEW INDUSTRIAL USES for tripoli, a soft silica used in buffing and polishing compounds, has increased the demand for this effective natural abrasive, according to a bulletin recently released by Dr. R. R. Sayers, Director of the Bureau of Mines.

In addition to its use to polish metals, tripoli has been employed as a concrete admix, as absorbents for fats, greases and stains in dry cleaning, as facing and dusting materials for foundry molds, in oil-well drilling fluids, and as a filler material for phonograph records, paints, stains and rubber, and in soap and scouring powders.

Principal native deposits of tripoli occur in Missouri, Oklahoma and Illinois, but it also is found in Alabama, Arkansas, Georgia, Mississippi, and Tennessee.

This bulletin, Information Circular 7371, Tripoli, may be obtained by writing the Bureau of Mines, Department of the Interior, Washington, D. C.

Conveyor leading to barge loading dock

Influence of Grading On Strength of Concrete

Letter to the Editor:

Dear Sir:

The article on page 169 of the February issue of ROCK PRODUCTS, "Influence of Grading on Strength of Concrete," takes me back to 1916. We argue now about strength of concrete and still confuse the factors.

The grading is a factor in the economy of labor and cement but it is not a factor in strength. The combined gradings, of which there are millions, require a certain amount of water per unit volume to bring the mass mechanical effect to that of plasticity. If the water is properly determined for this plastic condition, it will be found that for each determination on materials so graded, the water is always the same. This was known in 1916 as the "water demand." McMillan in his "Basic Principles of Making Concrete" calls this natural phenomena, "The Law of Constant Water."

The strength of concrete depends upon the bond between the particles. This bond strength is not the quantity but the quality of the bonding material. That quality is determined by the ratio of cement to water.

Careful selection and control of combined mixtures will enable the technician to use a minimum of cement for a given strength. If the workability is objectionable, the technician may be forced to use more water and cement or he may change his combined grading to one that will fit his placing plan and equipment with less cement.

It is true that the finer the mixture, the more water will be required to bring the mass to a plastic condition. But, it must be recognized that to get the same strength the finer mix will also require additional cement. That is a matter of economy in the use of cement and materials but not a factor in strength.

Yours truly,
STANLEY M. HANDS,
Testing Engineer,
Oakland, Calif.

Reopen Mica Mine

THE FLETCHER MICA MINE on Fletcher Mountain near Groton, N. H., has been studied and mapped by the United States Geological Survey as part of a general investigation of domestic mica deposits. During the war the mine had been operated by a mining company of Plymouth, N. H., under lease from the Town of Groton. Commercial sheet mica of a clear rum color is found. Plans are being considered for reopening the mine.

Method for the Analysis of Limestone

Application of American Society for Testing Materials alternate methods for portland cement to analysis of limestones

By R. A. LOVELAND*

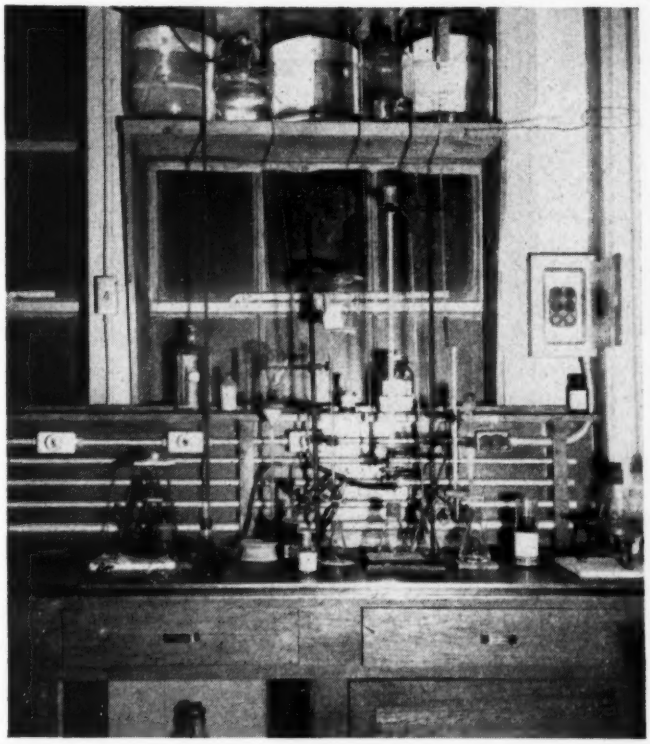
Apparatus:

25 ml. platinum crucible with platinum lid, notched watch glass and small stirring rod with flattened end for same.

Source of high temperature. (Three acetylene air burners with converging flame are satisfactory. See illustration.)

Reagents:

See section[1] 33 to 36 inclusive.



Laboratory apparatus for making analysis of limestones for portland cement comprise a 25 ml. platinum crucible, notched watch glass, small stirring rod, and three acetylene air burners

TO DETERMINE calcium carbonate equivalent by acid alkali determination, (see Meade Portland Cement, 3rd edition, page 503) the following procedure is used. The calcium carbonate equivalent should be above 75 per cent if reasonably rapid solution of ignited sample is to be expected.

Procedure:

Weigh 0.5 gr. sample[2] into 25 ml. high form platinum crucible. Ignite[3] covered crucible for 5 minutes at 2200 to 2400 deg. F. Cool, cover with notched watch glass, add 5 ml. concentrated HCl with pipette and bring into solution by heating and moderate pressure with flattened glass rod.

Add 1 gr. solid ammonium chloride and evaporate with crucible raised slightly above hot plate until residue has pasty consistency. (Usually 15 to 30 minutes—see illustration.)

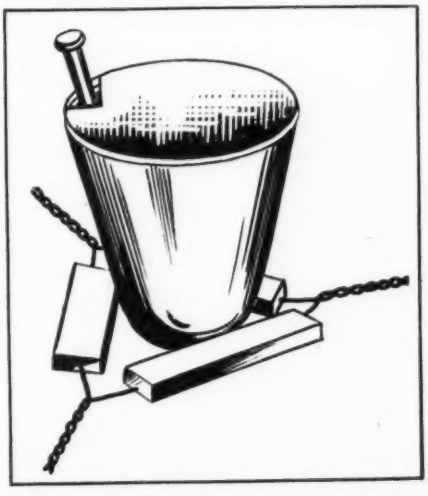
Proceed as in section 33 but do not add nitric acid. Use Schleicher and Schuell No. 589 black ribbon filter paper or equivalent. Use 1 to 9 hot HCl wash instead of 1 to 99. Filter into 150 ml. beaker.

If silica exceeds 10 per cent it is recommended that the hydrofluoric acid purification to be carried out unless previous work indicates that this correction is insignificant. See section 8d.

Add several drops of nitric acid to filtrate which should be about 75 ml. Bring to boil, add a few drops of methyl red, then ammonia from dropping bottle, stirring rapidly until red color of solution changes to yellow (add more indicator if colors fade) then nitric acid drop-by-drop until faintly acid, and finally ammonia drop-by-drop until the color becomes a distinct yellow. Boil for 1 minute. Remove from hot plate and test odor, cautiously; if no odor add one drop of ammonia, boil again and repeat. Odor of ammonia should be faint but unmistakable; if strong, acidify with few drops of HNO_3 and neutralize.

Filter on similar paper as used for silica into 400 ml. beaker.

If at this point R_2O_3 is estimated to be less than 4 per cent, scrub beaker with policeman and wash precipitate 8 to 10 times on filter with hot ammonium chloride[4] solution. (20 gr. per liter) Ignite and weigh.



Platinum crucible (25 ml.) with stirring rod having flattened end

If R_2O_3 is estimated at more than 4 per cent, rinse out beaker and wash precipitate once on the filter with hot ammonium chloride solution. Return precipitate and filter paper to original beaker. Add 10 ml. concentrated HCl and heat gently while stirring until paper is pulped.

Dilute to 50 ml. and precipitate as before; rinse and police beaker, wash on filter six times with hot ammonium chloride solution, ignite and weigh.

The volume of filtrate at this point should be about 200 ml.; evaporate to this volume if necessary.

Put a small piece of filter paper under the stirring rod (to prevent bumping) and bring to boil; add 10 per cent solution of oxalic acid[5] drop-by-drop until precipitate starts to form, then 20 ml. boiling ammonium oxalate solution (50 gr. per liter) and ammonia drop-by-drop to a distinct yellow.

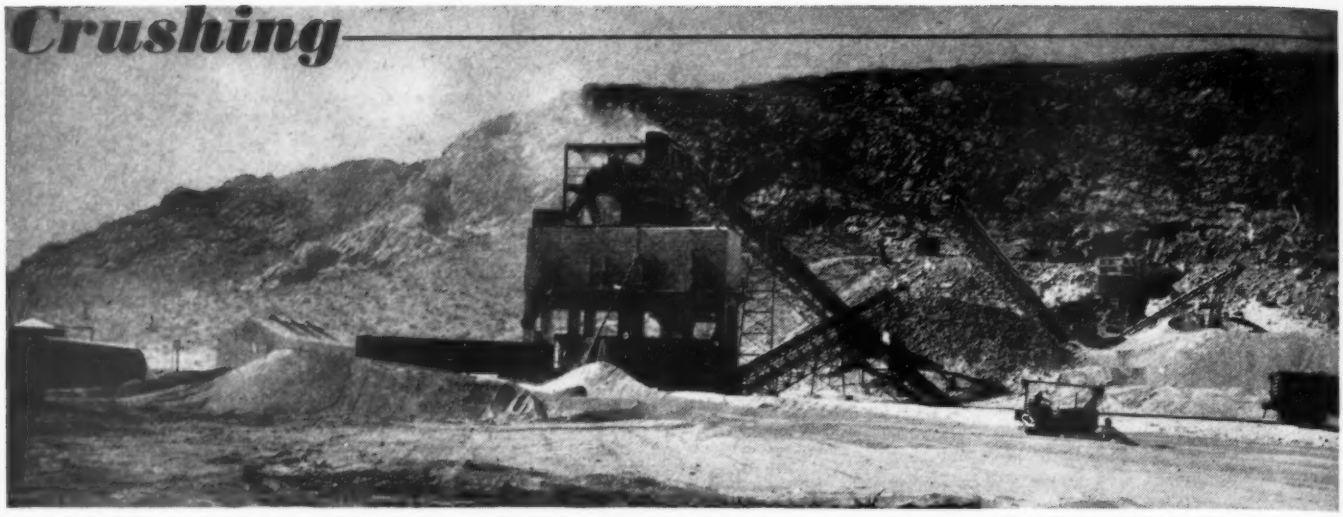
Boil for 5 minutes, let settle and filter into 400 ml. beaker, using medium texture filter paper.

Rinse beaker and wash precipitate once on the filter. Set aside filtrate for magnesia determination. Continue the washing and titrate according to section 35, except that permanganate solution made so that 1 ml. equals approximately 0.003 grams CaO is to be preferred.

Standardization checks with dried

(Continued on page 108)

*Marquette Cement Manufacturing Co.



Overall view of crushing and screening plant for the production of lime kiln stone and "sugar" rock. Primary jaw crusher unit may be seen to the right in the background; screen to remove all minus ¼-in., is fed by short belt conveyor immediately in front of primary crusher. Final screening and secondary crushing unit over concrete bins receives material from surge storage pile by means of vibrating pan feeder to belt conveyor inclining up to plant

Processing Stone for Rotary Lime Kilns and Sugar Rock

United States Lime Products Corporation opens new quarry and crushing plant at Arrolime, Nevada

By L. N. GRINDELL*

REPLACING the old high calcium limestone quarries and crushing plant at Sloan, Nev., is a new quarry and plant of the United States Lime Products Corporation at Arrolime, Clark County, Nevada. The new source of stone is 18 miles north of Las Vegas, and 37 miles north of the company's calcining and processing plant which continues in operation at Sloan, Nev. At its new location, the company is now producing all of its requirements of rotary kiln size limestone and sized limestone for the beet sugar industry.

Limestone deposits at Arroline are made up wholly of carbonate beds of Devonian age. The holdings of the company include three isolated limestone hills, rising steeply on the west to an altitude of 2600 ft. or 200 ft. above the surrounding valley at their base. The limestone beds dip to the west at an angle of 40 deg. and vary in thickness from a few inches up to several feet, each bed being separated by a very thin parting of calcareous clay. The limestone in these deposits is of a pure grade, is microcrystalline and varies in color from light gray to black.

Drilling and Blasting

The present quarry was opened up at an altitude of 2475 ft. or 75 ft. above the base on the middle and largest of the three limestone hills. The quarry was started at this elevation to take advantage of gravity flow, compactness of plant, and to keep the working face less than 125 ft. high.

Drilling is done with an Ingersoll-Rand DA-35 wagon drill. Flat holes are drilled at the base of the quarry face to a depth of 30 to 32 ft. and spaced from 12 to 16 ft. apart, depending upon the burden. Breast or relief holes are drilled to relieve the flat holes because of the dip of the beds. The holes are chambered and then loaded with 40 per cent and 60 per cent granular bag powder. Compressed air powder loading guns are used in loading the holes. Electric blasting caps are used for detonation.

Crushing and Screening

The limestone breaks very well but is too large for the primary crusher, making secondary drilling necessary. Ingersoll-Rand S-49 Jackhammers are used in secondary drilling. Air for drilling is furnished by an Ingersoll-Rand 360 stationary compressor located in the main powerhouse.

Stone is loaded by a Northwest Model 6 Diesel-powered shovel having a 1½-cu. yd. manganese steel bucket. Stone is hauled to the primary crusher, an average distance of 800 ft., by two International 5-cu. yd. dump trucks.

The 30- x 42-in. Pioneer jaw crusher, powered by a D-13000 Caterpillar Diesel engine and fed by a 4- x 8-ft. Traylor Sheridan grizzly feeder, reduces the stone to a minus 6 in. The stone through the grizzly feeder and the crusher discharge drop onto a 36-in. belt conveyor, 30-ft. centers, that carries the stone to a 4- x 10-ft. Symons double-deck screen, having 1½-in. openings on the top deck and ¼-in. openings on the lower deck. All material minus ¼-in. is wasted at this point, the waste being conveyed to one side by a 16-in. belt conveyor, 100-ft. centers.

The minus 6-in., plus ¼-in. stone discharged from the Symons screen is conveyed by a 36-in. belt conveyor, 115-ft. centers, to a surge storage pile. Under this storage pile in a concrete tunnel is a heavy duty Jeffrey Vibrator pan feeder that feeds the stone onto a 36-in. belt conveyor, 161-ft. centers, that carries the stone to the secondary crusher building. The plus 6-in., minus ¼-in. stone from the 36-in. belt conveyor drops onto a 4- x 10-ft. Allis-Chalmers single-deck screen having 3-in. square openings. The plus 3-in., minus 6-in. stone (called sugar rock) is scalped off and dropped into two 50-ton loading bins. The minus 3-in. stone is dropped onto a 4- x 12-ft. Allis-Chalmers double-

*Superintendent of Nevada operations.

deck screen, the top deck having 1¾-in. openings and the lower deck having ⅜-in. openings.

Minus 3-in., plus 1¾-in. stone is discharged into a surge bin ahead of the secondary crusher. The minus 1¾-in. plus ⅜-in. is dropped into two 50-ton kiln rock loading bins. The minus ⅜-in. stone through the lower deck is discharged to the side of the secondary building, pending installation of additional crushing and pulverizing equipment.

The secondary crusher, a 9- x 38-in. Alloy Roller Bear jaw crusher, reduces the minus 3-in., plus 1¾-in. stone from the top deck of the 4- x 12-ft. screen to 100 per cent minus 1¾-in. This product is discharged into a hopper that feeds it onto an 18-in. belt conveyor, 100-ft. centers, that carries it to a point just outside the surge pile tunnel where the stone is discharged onto the 38-in. belt conveyor, 161-ft. centers, thence making the return circuit over the screens.

The plant has a capacity of 100 tons per hour, producing 50 per cent minus 6-in., plus 3-in. stone and 50 per cent minus 1¾-in., plus ⅜-in. stone.

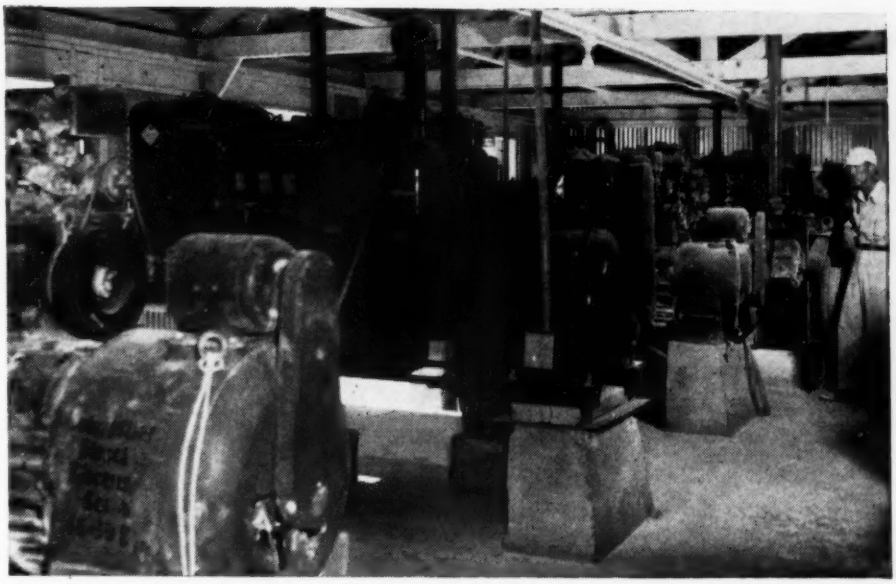
Power for all electric motors and other electrical equipment is generated on the job. The power plant consists of two 46-30 E Caterpillar Diesel-electric sets and one UD18 International Diesel-electric set.

A 4500 ft. railroad spur off the main line of the Union Pacific Railroad runs into the property and just in front of the loading bins. Railroad cars are loaded direct from the bins, loading being controlled by rack and pinion gates equipped with chain wheels operated from the ground level.

A crew of 18 men operate the complete plant, including the quarry, garage, powerhouse and crushing plant.

Minus 6-in., plus 3-in. (sugar rock) is shipped to the factories in Southern California, and the minus 1¾-in., plus ⅜-in. (rotary kiln feed) is shipped to the company's calcining plant at Sloan, Nev.

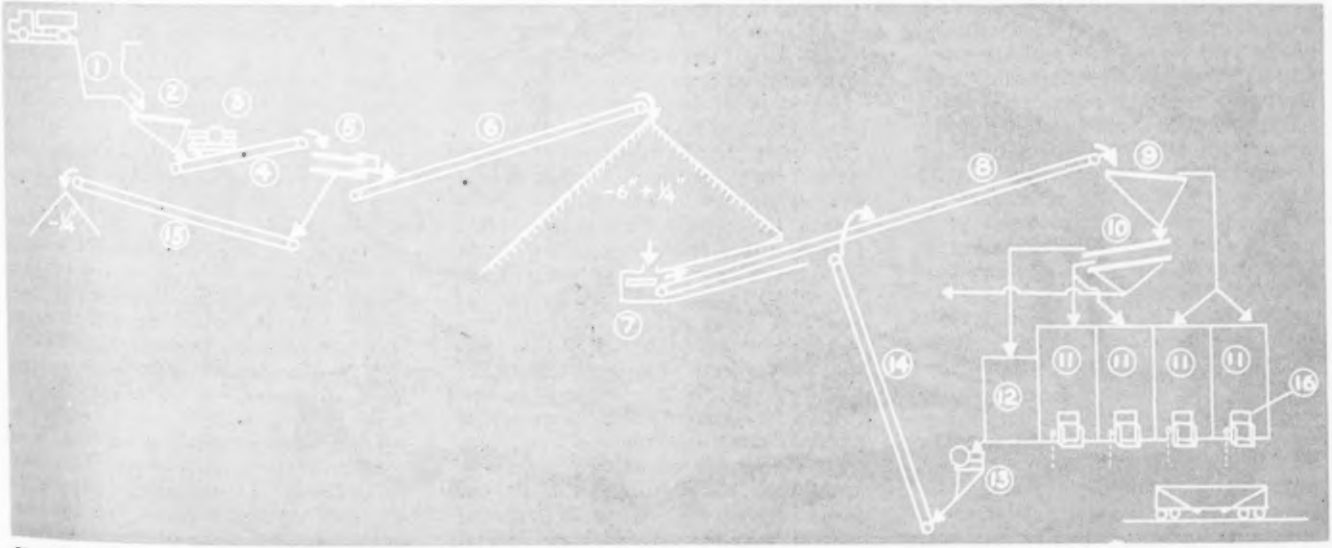
The main offices of the company are located at 1840 East 25th street, Los Angeles, Calif. Officers of the company are: K. Ellsworth, general manager; L. N. Grindell is in charge of the Nevada operations, W. O. Brown is quarry superintendent, and W. W. Sanger is quarry foreman.



Three Diesel-electric sets supply all electric power for conveyors, screens, and secondary crusher. Primary crusher is powered by its own Diesel engine

File Tax Suit

DIXIE SAND AND GRAVEL CO., Chattanooga, Tenn., has filed suit in chancery court claiming that its "floating" equipment, including boats and dredges, valued at $50,000, is assessed for taxation in both Hamilton and Marion counties. The company seeks a declaratory judgment as to which county has the right to tax this property. The company has a screening plant on the bank of the Tennessee river, within the city limits, in Hamilton county, which has been assessed at $7600, but the dredging equipment has been used on a sandbar extending into the river in Marion county. Heretofore the tax on floating equipment valued at $50,000 has been paid to Marion county. As the equipment has been docked at the screening plant, the Hamilton county assessor proceeded to place the floating equipment on the tax rolls of the county. The company therefore has asked the court which county is entitled to the tax on the floating equipment.



Flowsheet of crushing and screening plant operations for the production of lime kiln stone and "sugar" rock. (1) primary bin; (2) grizzly, 4- x 8-ft.; (3) jaw crusher, 30- x 42-in.; (4) 36-in. belt conveyor, 30 ft. centers; (5) 4- x 10-ft., double-deck screen; (6) 36-in. belt conveyor, 115 ft. centers; (7) vibrating pan-type feeder; (8) 36-in. belt conveyor, 161 ft. centers; (9) 4- x 10-ft., low-head, single-deck screen; (10) 4- x 12-ft., low-head, double-deck screen; (11) storage bins, 50-ton capacity; (12) surge bin, 20-ton capacity; (13) 9- x 38-in. jaw crusher; (14) 18-in. belt conveyor, 100 ft. centers; (15) 14-in. belt conveyor, 100 ft. centers; (16) bin gates with chain sprockets

MECHANIZING
Quarry and Plant to Step Up Production

By GORDON R. LACY*

WITH RISING COSTS of production, the trend of lime producing units is toward higher plant capacity and lower labor requirements. Many small capacity plants are now making quality lime products with comparatively high labor requirements where complete rebuilding or rearrangement of the plant to enlarge capacity is not practicable either mechanically or economically. However, very often it is possible to rearrange the plant for the same capacity but with lower labor requirements.

To start at the proper point in the items making up the final cost of burned lime or hydrated lime, an analysis of stone producing cost must first be made. If this item can be reduced, a saving of almost double the stone cost reduction will be found in burned lime cost. For example, a 20¢ reduction in stone cost will reflect in a burned lime cost about 36¢ a ton lower.

The plant making 150 tons of lump lime per day is taken as the basis for discussion. Such a plant will require something less than 300 tons of suitably sized kiln stone per 24 hours. In addition to this, there will be produced a certain amount of smaller stone sizes which may be disposed of in various ways. This may be used in kilns especially arranged for burning small stone, or for industrial or agricultural uses in various forms and sizes. A typical analysis of crusher production for making kiln stone might be as follows: 6- x 3-in., 60 per cent; 3- x 1½-in., 15 per cent; and under 1½-in., 25 per cent. Of course this can vary quite considerably with the nature of stone and type of crushing equipment.

Additional sizes of stone under kiln size should not ordinarily be more than 25 per cent of total quarry output. Using 75 per cent recovery of kiln stone, we come to a total quarry tonnage of 400 tons to supply 300 tons of kiln stone, or 50 tons per hour for an 8-hour day.

Stripping

Stripping overburden in a small quarry operation is ordinarily not a day by day production item. It is usually done periodically, uncovering from several months, to perhaps several years' supply of stone. For this reason it is not considered in the analysis of direct labor, but will be included in the controllable burden item given later.

Drilling and Blasting

Direct labor in a quarry begins with the primary drilling. While well drill equipment can and is being used in some small operations, the most suitable types of drilling equipment for such work may be selected from a list which includes the wagon drill, tripod mounted drifter, or hand-held jackhammer. Each has its advantage depending on the width and height of face being worked and the contours of the surface stone. The wagon drill can be used to better advantage than the other two in being able to handle somewhat longer drill steel and with fewer changes per hole. However, movement and setting up of the equipment is not as easy where the stone surface is heavily eroded or otherwise very irregular. The tripod drifter can be used with steel lengths longer than in a jackhammer but not as long as usually used in wagon drills. It is quite suitable for single bench quarrying of perhaps 20 ft. depth. The hand-held jackhammer will handle reasonably long steel, is quite portable for multiple benches at a face, and is least expensive of the group in initial investment. It also

*Azbe Corporation, St. Louis, Mo.

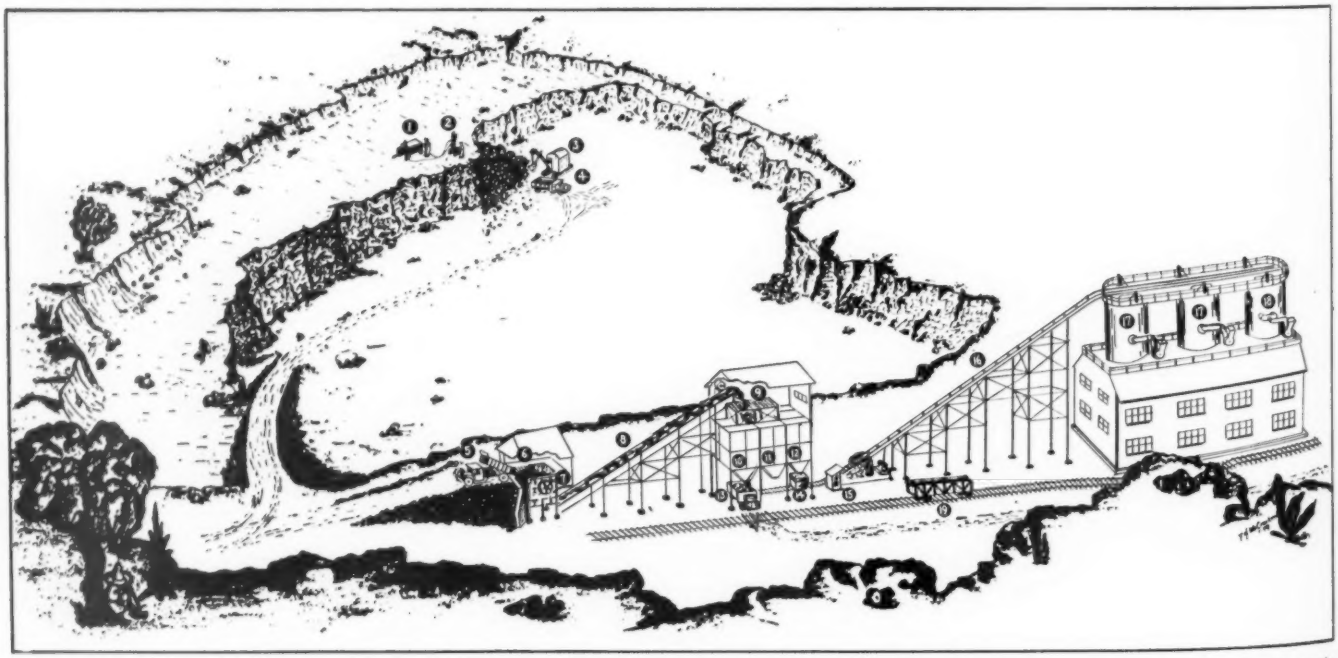


Fig. 1: Showing quarry and plant arrangement for small capacity lime plant. (1) air compressor; (2) primary drill; (3) power shovel; (4) truck loading; (5) truck dumping; (6) crusher feeder; (7) primary crusher; (8) belt conveyor; (9) vibrating screen; (10) storage for —1½-in. stone; (11) storage for +1½-in. to —3-in. stone; (12) storage for +3-in. to —6-in. stone; (13) truck for small size disposal; (14) kiln charging car; (15) hoist for charging car; (16) incline for charging car; (17) kilns for large stone (3-in. to 6-in.); (18) kiln for medium stone (1½-in. to 3-in.); (19) railroad facilities for stone and lime shipments

can be used to do secondary blockholing or popping if not fully occupied with primary drilling. However, it would be well to have a second jackhammer for this blockhole drilling not only for that purpose but as a spare for the primary drill.

An alternate for the blockhole drill that is being employed quite widely is the drop ball. It consists of a spherical or pear shaped steel casting weighing perhaps 2500 to 3000 lbs. which is attached by cable to a crane boom or other rig and hoisted some distance. Allowing a free fall from that height to the stone to be broken, momentum of the ball does the work otherwise done by secondary blasting. The drop ball may also be used to scale loose or dangerous faces by being swung to dislodge unsafe stone.

Labor requirements for primary drilling should not be more than one driller and one helper on any of the three types of equipment, one more secondary driller or drop ball operator is needed, making a total of three men to break stone ready for loading. The work of these three men should normally allow them ample time for loading and firing the drill holes and doing necessary face scaling and cleaning to keep it in a safe working condition.

Loading and Haulage

Following secondary breaking, loading equipment next comes into the picture. A power shovel with a minimum bucket capacity of about ¾ cu. yd. or preferably a little larger should be used. The smaller size has the advantage in lower initial cost but the larger sizes are built perhaps more ruggedly for rock loading service, with consequent lower maintenance cost. The ¾-cu. yd. size is ample in capacity for the tonnage to be produced but requires that stone be broken to smaller size to pass the bucket than would be necessary when using a machine with perhaps a 1¼-cu. yd. bucket.

For haulage from the shovel, dump trucks with a capacity of about 5 tons of rock are suitable and with a reasonable haul length, two in active service should be adequate with a third as reserve. Hauling 5 tons per trip, each of the two would have to make 40 round trips in 8 hours or one trip in 12 minutes. Labor requirements for loading and hauling should be one shovel operator, two truck drivers, one utility man working principally around the shovel.

As an alternate to the use of a power shovel or in combination with it, it may be found necessary to do sorting and loading of stone at the quarry face by hand. Quality or special products are the usual reason for this type of operation. However, it is very difficult to find men suited to such work even if higher labor cost can be justified. In case it is necessary, either entirely or along with a power shovel, use of trucks with special hoists and detachable buckets will be found advantageous.

Showing close-up of Diesel-powered jaw crusher, grizzly, and feeder for mechanical preparation of stone for small capacity lime plant

Crushing and Screening

The next general step is the crushing and screening plant, its location, and arrangement. A long haul from quarry face to preparation plant and a short haul from there on to the kilns may not be any more advisable than the reverse situation of a short first haul and a long second haul. However, equipment used in the first step is usually considerably more flexible and adaptable to local conditions than that used for the second step and for that reason a longer first haul can be justified. Extremes of both cases are known with rock haulage of a half mile or more to the crusher in one case and in another a winding incline from the crushing plant to top of kilns of perhaps 1500 ft.

In general, this part of the quarry operation includes: (1) a heavy duty apron feeder, or other type feeder, under hopper into which quarry trucks dump their loads; (2) a primary crusher fed by the apron feeder; (3) a belt conveyor or bucket elevator taking crushed stone to; (4) a vibrating screen for sizing; and (5) storage bins for sized stone.

Fig. 1 shows an arrangement of the components of the quarry department. An earth-filled ramp of quarry waste can be built up to the required elevation for trucks to discharge to the apron feeder. A chain feeder may be used in preference to the apron feeder but some more headroom may be required to install a suitable hopper ahead of it. If the primary crusher is of the gyrating type a choke feed may be used, eliminating the feeder, but it is not desirable except where a very large machine is used with comparatively small loads. With the other usual types of primary crushers; namely, the roll crusher and jaw crusher, a steady controlled feed is desired.

Of the three types of crushers, the advantages of the roll and jaw crushers are about equal. They require less headroom, are readily changed for size of final product and changing wearing parts is more readily done. Some more power may be required per ton and the product may include elongated slabs, especially with the jaw type. The gyratory crusher for the same size primary feed is a considerably larger and higher machine and changing of wearing parts is more difficult. However, power requirements are less and the product will be more cubical in shape than slab-like. A valuable accessory to any of these types of crushers is a heavy air hoist or chain fall located over the crusher itself and fitted with a hook for rolling over large pieces that may lodge above the crushing action of the machine. Ordinarily any of these crushers large enough to receive stone passing the shovel bucket will have an hourly capacity far in excess of our desired 50 tons.

In moving the crushed stone to screen, available space and height of screen will determine whether an elevator or belt conveyor is to be used. With plenty of room and not too excessive height to elevate the stone, the latter is probably the more trouble free and suitable arrangement, while the former can be used in closer quarters if necessary. Proper orientation of the belt conveyor can be used to shorten haul from bins to kilns also.

Conveyor belt, screening, and storage facilities for small capacity lime plant. Conveyor to the right takes smaller size stone to storage for agricultural limestone preparation or other purposes while conveyor to the left carries stone into surge bin feeding conveyor inclining up to top of lime kilns

The screen should have two decks arranged to make three sizes, namely, 6- x 3-in., 3- x 1½-in. and minus 1½-in. The first size can be used in the ordinary vertical kiln, the second in a kiln especially arranged for medium or small stone and the remainder for further processing into industrial and agricultural sizes. A screen with horizontal decks has an advantage in lower headroom requirements but is subject to some blinding action requiring cleaning at intervals. A sloped deck screen takes more headroom but will clog less readily.

Storage

Bins for storage can be large or small, depending on plant conditions farther on the line. If adequate storage zones are available in the kilns and hoisting equipment is of sufficient capacity to fill them while the quarry is operating, only surge capacity is required. Kilns without a storage zone which should be charged at night or those which are operated over weekends when the quarry is not worked must be larger to hold such additional stone required during the non-operating quarry hours. The same holds true of bins for sizes not used in kilns. Stockpiles of stone also may be accumulated in good weather for use when adverse conditions prevent direct quarry-to-plant movement of stone. A stockpile may be built for easy reclamation by using belt conveyors from the primary screen, recovering stone for the kiln charging car by a conveyor operating in a tunnel under the stockpile.

Labor requirements for the crushing and screening plant should be no more than one man at the crusher and one man checking belt and screen operation.

Up to this point stone is in the bins classified as to size and ready for loading and transportation to further plant processes. From here on "quarrying" can be considered at an end and other departments assume responsibility for the material. It should be noted that except for drilling and blasting, inclement weather will not make a complete shutdown necessary. Operators of the equipment involved can work under suitable protection in shovel and truck cabs and under roof in crushing and screening buildings.

Labor requirements for all preceding operations include: primary drilling and blasting, two men; secondary breaking, one man; loading, one man; trucking, two men; crushing, one man; screening, one man; and general work, one man, a total of nine men. To this we could add a working foreman, a repair mechanic, and one more general utility man to make a grand total of 12 men to produce 400 tons of stone per day. Assuming an average payroll rate of $1.00 per hour, 8 hours per day, we have a labor cost per ton of stone produced at 24¢. If, instead of 400 tons of stone only 300 were required and an 8-hr. day still used, the labor cost would go to 32¢ per ton. With production up to 60 tons per hour or 480 tons per day, perhaps one more truck driver and one laborer would be needed, bringing labor cost to 23¢. A daily capacity of 480 tons would be well within the range of equipment outlined above. Fig. 2 shows above relationship in chart form together with resultant labor cost per ton of lime.

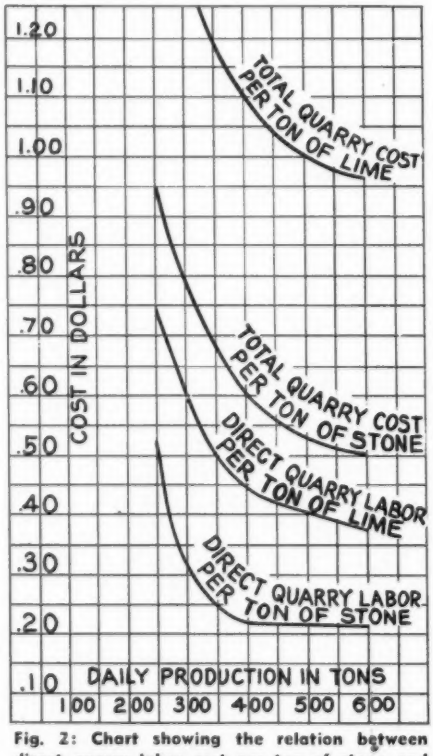


Fig. 2: Chart showing the relation between direct quarry labor cost per ton of stone and ton of lime and total quarry costs per ton of stone and ton of lime

To complete the estimated cost per ton of stone in the bins ready to leave the quarry, there must be added to the direct labor cost certain controllable items such as power supplies, repairs, stripping, explosives and certain fixed items such as depreciation, taxes, insurance, etc.

Our mythical quarry would no doubt have the required drilling equipment available, but probably would need to buy and install the remainder of the items involved. These include the shovel, two or three trucks, feeder, crusher, belt conveyor, screen and bins. An investment of perhaps $60,000 would seem within reason for doing it. Assuming 300 working days a year, fixed charges would run about as follows for the daily tonnage involved: 300 tons, 13¢; 400 tons, 12¢; and 480 tons, 10¢.

Further we can approximate above controllable costs at a figure equal to the direct labor cost of 32¢, 24¢, and 23¢ for 300, 400, and 480 tons, respectively.

Bringing them all together we get figures which, when charted and extended in Fig. 2, will give an approximate cost per ton of stone for any daily tonnage between about 250 and 600 tons. Stone cost per ton of lime is also included.

With a direct cost of 56¢ per ton of stone, the stone cost per ton of lime is only $1.01 and we believe that this stone cost per ton of lime is less than many producers can claim now as their stone cost itself. By correcting our assumed relationship of controllable cost to direct labor, average labor rate, and average fixed charges to local plant actual figures, one can set up the same general analysis for local conditions for a definite comparison with his current operating costs with what may be possible by studied rearrangement of his quarry operating plan.

An actual example is given below of a quarry plant arrangement that illustrates how far it is possible to go

in improving production and reducing costs, particularly labor, when local conditions are favorable. It is a simple arrangement not only low in producing cost but flexible.

This quarry operates a face about 40 ft. high. Primary drilling is done by well drill, using a jackhammer for secondary drilling and blasting. Additional equipment consists of the following major items together with the approximate purchase price.

1¼-cu. yd. shovel (used)	$ 7,000.00
Portable crusher, feeder, and conveyor	19,900.00
150-h.p., 1000 r.p.m. Diesel engine for power	4,900.00
Two dump trucks (used)	3,000.00
24-in. belt conveyor (60-ft. centers) from crusher to primary screen	2,000.00
4- x 10-ft. single deck primary screen	2,000.00
24-in. belt conveyor (40-ft. centers) for +3-in. stone to storage bin	1,000.00
50-ton storage bin	2,000.00
20-in. belt conveyor (20-ft. centers) for —3-in. stone to secondary screen	800.00
4- x 8-ft. double deck secondary screen	1,800.00
Three-compartment bin for products of above screen	1,500.00
Installation cost	4,000.00
Total	$49,900.00

Operating cost for this plant is exceptionally low. For producing 12,000 tons of stone, 560 ft. of well drilling is needed at $1.00 per foot plus 4300 lb. of dynamite at $15.00 per cwt. or a unit cost of $0.10 per ton of stone.

Additional labor requirements per day are as follows: one man, secondary drilling and blasting, 8 hours; one shovel operator, 8 hours; one truck driver, 8 hours; one crushing and screening plant operator, 8 hours; and one supervisor, 4 hours.

These 36 man-hours per day produce 600 tons of stone at an average hourly rate of $.90 or a unit cost of .054 per ton of stone. Such low labor needs are accomplished by using one truck driver handling two trucks, alternately driving one while the other is being loaded and by locating the equipment so that the crusher operator can see and control auxiliary belts and screens from the crusher location.

Low installation cost is due to use of equipment designed for portable plant operation. This feature makes the general arangement particularly suited for quarries where it may be of advantage to keep preparation equipment close to the quarry face as it advances or where local conditions make necessary moving from one quarry location to another in the same locality.

Summarizing the above costs and completing them by adding certain fixed and controllable burden items such as depreciation, repairs, insurance, taxes, interest, etc., the following costs are obtained: primary drilling and blasting, 0.100 per ton; labor crushing and sizing, 0.054 per ton; fixed charges at 25 per cent of $49,900 on 180,000 tons per year, 0.069 per ton; and controllable burden (supplies, repairs, insurance, supervision, etc.) 0.150 per ton.

This total cost of $0.373 per ton is exceptional and illustrates to what point selection of equipment and its arrangement for advantageous labor requirements can be carried as against a figure of about .50 per ton of stone on 600 tons daily production taken from a chart accompanying a recent article by the writer on this subject. The principal part of this saving is in the labor.

To emphasize the fact that all products of the quarry must be utilized for low cost operation, we want to point out the trade outlets for which various fractions of the primary crusher product are used. The primary crusher produces a minus 6-in. product. Passing this over a 3-in. mesh on the 4- x 10-ft. primary screen gives a 3- x 6-in. size for vertical kiln use. This is handled into a 50-ton bin from which a 20-in. belt conveyor (125-ft. centers) not previously mentioned is used to deliver it to the kiln top where it is distributed to the kilns by a lateral belt conveyor.

Minus 3-in. material is taken by another belt conveyor to the double deck 4- x 8-ft. secondary screen where screen sections of 1½-in. and ¼-in. mesh make the separation into 1½- x 3-in., ¼- x 1½-in., and minus ¼-in. Stone 1½- x 3-in. is used in foundries, for road base work, and further crushed in a hammermill for agricultural purposes. The ¼- x 1½-in. size is used in road construction and concrete aggregates, while the minus ¼-in. is used in cement block manufacture.

It should be noted that the above described plant is perhaps the exception rather than the rule, but nevertheless other operations can guide their planning along such lines to approach if not equal the performance outlined. It is also an exception in that direct diesel power is provided for the crusher and that a belt conveyor is used for the charging of the kilns. Kiln charging is accomplished during the periods the kiln is drawn and draft is off. Charging is done through comparatively small doors in the kiln tops.

Certain-teed Safety Record

CERTAIN-TEED PRODUCTS CORPORATION, Acme, Texas, plant recently celebrated by shutting down after running 24 hours a day, seven days a week for a year. The shut-down was to permit employes to attend a banquet for its excellent safety record as safety champion of The Gypsum Association. Joe Watt, plant safety engineer and foreman in charge of quality control, received from A. R. Parrish, Liberty Mutual engineer, the first of the Liberty Mutual Accident Prevention flags to carry a star for repeat performance. O. Grieve, general manager of all gypsum plants and Paul McInerney, general safety director for Certain-teed Products Corporation, came from Chicago for the celebration. H. J. Zelms, plant manager, was presented a gold trophy by Mr. Grieve.

Mineral Production At New Peak

MINERAL PRODUCTION in 1946 reached an all-time peak, according to Secretary of the Interior J. A. Krug. The Bureau of Mines reports the value at $8,900,000,000, a gain of 9 per cent over 1945. New production records were made for potash and phosphate rock. Cement shipments increased from less than 108,000,000 bbl. in 1945 to 175,000,000 bbl. in 1946, a gain of more than 60 per cent. Sand and gravel attained an output of 290,000,000 tons compared with 196,000,000 tons in 1945. Stone used as aggregate made large gains, but agricultural and metallurgical demands declined. However, the overall gain in sales of stone was about 25 per cent with an output of 190,000,000 tons valued at $240,000,000. This does not include stone for cement and lime manufacture. Total value of lime output was $45,000,000, about one per cent less than in 1945. Sales of building lime increased, but agricultural and metallurgical demands dropped moderately.

Ballast Sand for Molding

FOR more than 60 years countless tons of ballast sand have been dumped along the British Columbia coast near Vancouver, B. C., by ships "lightering up" before taking on cargoes. There is a tariff charge against this sand if landed, which does not apply when dumped. However, the sand is now much more valuable than the duty and a plan is underway to dump the ballast onto scows and bring it ashore to be used in foundry work.

Montana Phosphate

WILLIAM ANDERSON, Garrison, Mont., has leased 200 acres of phosphate lands near Great Falls, Mont., from the Bureau of Land Management. The lease, awarded on the basis of a $700 bonus bid, requires the payment of a royalty of 5 per cent of the gross value phosphate rock or other mineral products produced on the land. It also requires a minimum investment of $10,000 during the first three years of the lease, and a minimum production of 2000 tons a year beginning with the fourth lease year.

Start Gypsum Operations

GYPSUM PRODUCTS, INC., Powell, Wyoming, has resumed mining operations, according to Lloyd Taggart, president. The plant formerly was owned by the Wyoming-Midland Gypsum Co., but has been reorganized and will be in full operation by late Spring. Shipments are now being made for agricultural purposes.

Kiln Shell Heat Loss Re-evaluated

More exact calculation of heat loss from kiln shells now possible through recent investigation

By W. R. BENDY* and H. STRAIGHT*

EXPERIMENTAL DATA on heat loss from kiln shells is limited. As a result, kiln heat balances often contain the item "radiation and unaccounted for." In recent years, heat loss under comparable conditions has been re-investigated very thoroughly. The time now seems opportune to use this data for a more exact calculation of heat loss from kiln shells.

Total heat loss is divided into two types:

(1) radiation
(2) convection (including conduction)

Radiation

Radiation follows the Stefan-Boltzmann law which has been used extensively and is generally accepted. This law states:

$$H_r = 17.23 \times 10^{-10} \times (T_1^4 - T_2^4) \times F$$

where H_r = B.t.u. per sq. ft. per hour
T_1 = Temperature of radiating body, deg. F. abs.
T_2 = Temperature of receiving body, deg. F. abs.
F = Function of the emissivities of the radiating and receiving bodies. (In this case it may be considered equal to the emissivity of the radiating body, since the kiln is small in comparison to the enclosing structure.)

Simplifying,

$$H_r = 17.23 \times 10^{-10} \times \epsilon \times (T_1^4 - T_2^4)$$

B.t.u. per sq. ft. per hour where ϵ is the emissivity of the radiating body.

Values for the emissivity are given by R. H. Heilman[1] who investigated the emissivity of rough steel plate, (1, 3 and 10 in. pipes), and found that emissivity varied with temperature as follows:

Temperature °F	Emissivity ϵ
100	0.945
200	0.950
300	0.955
400	0.961
500	0.969
600	0.975
700	0.975

Convection

Heilman[1] reports also a convection equation for horizontal cylinders as follows:

$$H_c = 1.016 \times \left(\frac{1}{D}\right)^{0.2} \times \left(\frac{1}{T_{avg.}}\right)^{9.181} \times t^{1.266}$$

where H_c = B.t.u. per sq. ft. per hour
D = Diameter of cylinder, inches
$T_{avg.}$ = Average temperature of shell and surroundings, deg. F. abs.
t = Temperature difference between shell and surroundings, deg. F.

Heilman[2] states that the effect of the shape factor, $\left(\frac{1}{D}\right)^{0.2}$, becomes

*Consulting Engineers.

TABLE I: TOTAL HEAT TRANSFER FROM SINGLE KILN—BTU PER SQ. FT. PER HR.
Surrounding Temperature — 70° F.

°F.	0	10	20	30	40	50	60	70	80	90
0								0	13	28
100	44	61	79	98	118	140	163	187	211	236
200	262	289	317	346	376	408	441	475	509	545
300	582	620	660	701	743	787	833	881	929	978
400	1029	1082	1136	1192	1250	1310	1372	1436	1502	1569
500	1637	1707	1779	1853	1930	2010	2092	2176	2262	2350
600	2440	2532	2626	2722	2820	2921	3025	3131	3240	3351
700	3465	3582	3702	3825	3951	4079	4210	4344	4481	4621
800	4765									

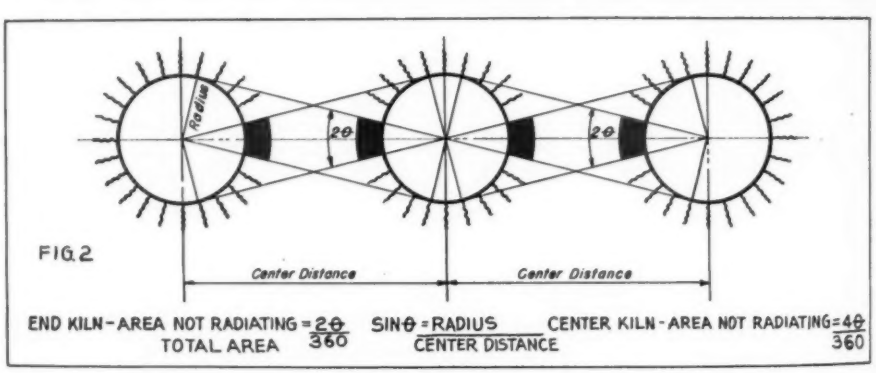


FIG. 2

Fig. 2: Reduced radiation loss from adjacent kilns

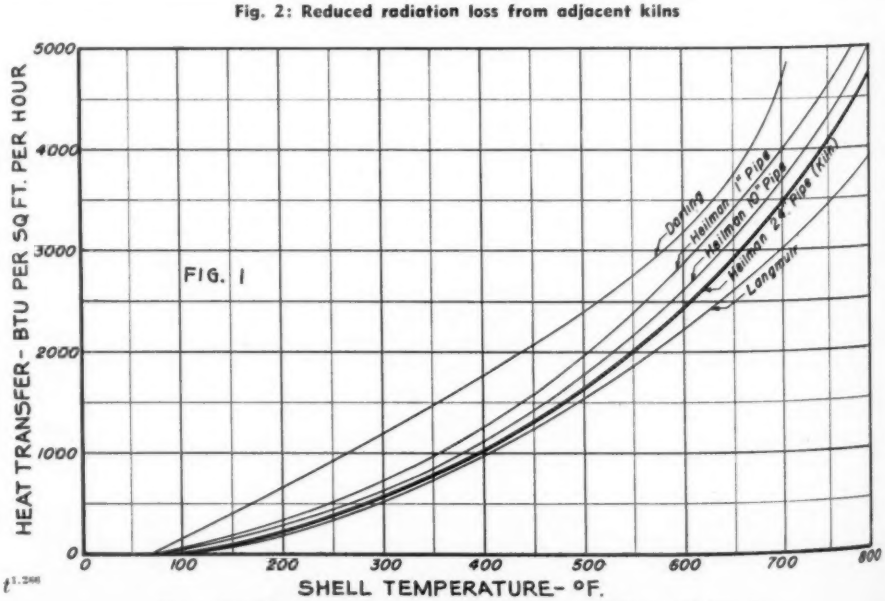


FIG. 1

Fig. 1: Total heat transfer. Temperature of surroundings, 70 deg. F.

constant when D reaches 24 in. in diameter. When cylinders are 24 in. in diameter and larger, the following simplified equation applies:

$$\text{Heat Loss} = \left(1 - \frac{\text{Area not radiating}}{\text{Total Area}} \times \frac{\text{Radiant heat loss}}{\text{Total heat loss}}\right) \times \text{Value}$$

↓ from Table I

$$H_c = 0.5381 \times \left(\frac{1}{T_{avg.}}\right)^{0.181} \times t^{1.206} \text{ B.t.u. per sq. ft. per hr.}$$

(Continued on page 90)

Total Heat Loss from a Single Kiln

Table I shows the sum of radiation and convection at different kiln shell temperatures, with a surrounding temperature of 70 deg. F. Heilman's data is plotted in Fig. 1, together with the results of earlier investigators. The Heilman values are substantially lower than the Darling[3] values which have heretofore been used extensively in kiln heat balances.

If some other base temperature than 70 deg. F. is used, correction values given in Table II should be added to the values of Table I.

Reduced Heat Loss from Adjacent Kilns

T. Yoshii[5] points out that radiant heat loss decreases when kilns are installed side by side, due to the portions of other kilns "seen" by the kiln under consideration. When the shell temperatures are the same, there can be no radiation from the "seeing" portion. The area which does not radiate is a function of diameter divided by center distance (see Fig. 2). When the kiln is paralleled by a kiln on one side only,

$$\frac{\text{Area not radiating}}{\text{Total Area}} = \frac{2 \sin^{-1}\frac{\text{radius}}{\text{center distance}}}{360}$$

When paralleled by kilns on both sides,

$$\frac{\text{Area not radiating}}{\text{Total Area}} = \frac{4 \sin^{-1}\frac{\text{radius}}{\text{center distance}}}{360}$$

The above effect applies to radiant heat only. Therefore, the ratio of radiant heat to total heat loss, which varies with temperature as shown in Fig. 3, must be included in calculating reduced total heat loss. The total loss as modified by proximity to other kilns is as follows (see equation, above):

TABLE II: CORRECTION VALUES FOR BASE TEMPERATURES OTHER THAN 70° F.
BTU per sq. ft. per hr.
Use in Conjunction with Table I

Base Temp. °F.	Shell Temperature °F.							
	100	200	300	400	500	600	700	800
40	+46	+51	+55	+57	+60	+62	+64	+64
50	+30	+35	+38	+39	+40	+41	+43	+44
60	+15	+17	+20	+20	+21	+21	+22	+22
70	0	0	0	0	0	0	0	0
80	—14	—18	—19	—20	—21	—22	—22	—23
90	—30	—35	—41	—41	—43	—44	—44	—45
100	—44	—55	—61	—62	—64	—66	—67	—69

TABLE III: MULTIPLYING FACTORS FOR KILN PARALLELED BY OTHER KILNS ON ONE SIDE ONLY
Use in Conjunction with Table I

Diameter / Center Distance	Shell Temperature — °F.							
	100	200	300	400	500	600	700	800
0.16	0.982	0.983	0.982	0.981	0.980	0.980	0.979	0.978
0.18	0.980	0.980	0.980	0.979	0.978	0.977	0.976	0.976
0.20	0.977	0.978	0.977	0.976	0.975	0.974	0.973	0.973
0.22	0.975	0.976	0.975	0.974	0.972	0.971	0.971	0.970
0.24	0.973	0.973	0.973	0.971	0.970	0.969	0.968	0.967
0.26	0.971	0.971	0.970	0.969	0.968	0 966	0.965	0.965
0.28	0.968	0.969	0.968	0.966	0.965	0.963	0.962	0.961
0.30	0.966	0.967	0.965	0.964	0.962	0.961	0.960	0.959
0.32	0.964	0.965	0.963	0.962	0.960	0.958	0.957	0.956
0.34	0.961	0.963	0.961	0.959	0.957	0.956	0.955	0.954
0.36	0.959	0.960	0.959	0.957	0.955	0.953	0.952	0.951
0.38	0.957	0.958	0.956	0.954	0.953	0.951	0.950	0.948
0.40	0.955	0.956	0.954	0.952	0.950	0.948	0.946	0.945
0.42	0.952	0.954	0.952	0.950	0.947	0.945	0.944	0.942
0.44	0.950	0.951	0.950	0.947	0.945	0.943	0.941	0.940
0.46	0.948	0.949	0.947	0.945	0.942	0.940	0.939	0.937
0.48	0.945	0.947	0.945	0.942	0.939	0.937	0.935	0.934
0.50	0.942	0.944	0.942	0.939	0.936	0.934	0.932	0.930
0.52	0.940	0.942	0.940	0.937	0.934	0.932	0.930	0.928
0.54	0.938	0.940	0.937	0.934	0.932	0.929	0.927	0.925
0.56	0.936	0.937	0.935	0.932	0.929	0.927	0.924	0.923
0.58	0.933	0.935	0.933	0.929	0.926	0.923	0.921	0.919
0.60	0.931	0.933	0.930	0.927	0.924	0.921	0.918	0.917

TABLE IV: MULTIPLYING FACTORS FOR KILN PARALLELED BY OTHER KILNS ON BOTH SIDES
Use in Conjunction with Table I

Diameter / Center Distance	Shell Temperature — °F.							
	100	200	300	400	500	600	700	800
0.16	0.964	0.965	0.964	0.962	0.960	0.958	0.957	0.956
0.18	0.959	0.960	0.959	0.957	0.955	0.953	0.952	0.951
0.20	0.954	0.955	0.954	0.952	0.950	0.948	0.946	0.945
0.22	0.949	0.951	0.950	0.947	0.945	0.943	0.941	0.940
0.24	0.945	0.946	0.945	0.942	0.940	0.939	0.936	0.934
0.26	0.941	0.942	0.941	0.938	0.935	0.932	0.930	0.928
0.28	0.936	0.937	0.936	0.933	0.929	0 927	0.925	0.923
0.30	0.932	0.933	0.931	0.928	0.925	0.922	0.920	0.918
0.32	0.927	0.929	0.927	0.923	0.920	0.917	0.915	0.913
0.34	0.922	0.924	0.922	0.918	0.915	0.912	0.909	0.907
0.36	0.918	0.920	0.918	0.913	0.909	0.906	0.903	0.901
0.38	0.913	0.915	0.913	0.908	0.904	0.901	0.898	0.896
0.40	0.909	0.911	0.908	0.903	0.899	0.896	0.893	0.890
0.42	0.904	0.906	0.903	0.898	0.894	0.891	0.888	0.885
0.44	0.899	0.901	0.898	0.893	0.889	0.885	0.882	0.879
0.46	0.895	0.897	0.894	0.889	0.884	0.879	0.876	0.873
0.48	0.890	0.892	0.889	0.884	0.879	0.874	0.871	0.868
0.50	0.885	0.888	0.884	0.879	0.874	0.869	0.865	0.862
0.52	0.880	0.883	0.879	0.874	0 869	0.864	0.860	0.856
0.54	0.875	0.878	0.874	0.869	0.864	0.858	0.854	0.850
0.56	0 871	0.874	0.870	0.864	0.858	0.852	0.848	0.844
0.58	0.866	0.869	0.865	0.859	0.853	0.847	0.843	0.839
0.60	0.861	0.864	0.860	0.854	0.848	0.842	0.837	0.833

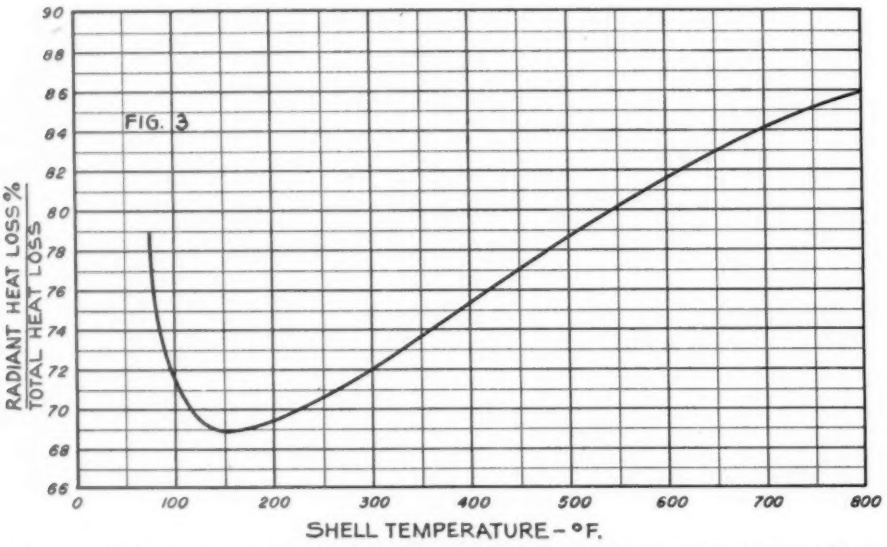


Fig. 3: Ratio of radiant heat loss to total heat loss from kiln shell. Temperature of surroundings, 70 deg. F.

= F × Value from Table I (For value of F, see Table III when kilns are on one side only, or Table IV when kilns are on both sides.)

The following example illustrates the use of these tables.

Shell temperature 500 deg. F.
Surrounding temperature 60 deg. F.
Heat Loss from a single kiln

= 1637 + 21
= 1658 B.t.u. per sq. ft. per hr.

If the kiln is one of a battery, with a diameter to center distance ratio of 0.30,
Heat Loss from kiln with kilns on one side only

= 1658 × 0.962
= 1595 B.t.u. per sq. ft. per hr.

Heat Loss from kiln with kilns on both sides

= 1658 × 0.925
= 1534 B.t.u. per sq. ft. per hr.

Other Factors

There is insufficient data available to evaluate the effect of kiln rotation and exposure to wind and rain.

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[3] Darling, C. R., **Engineering** (London), 643 (Mar., 1919).
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Producing Perlite

NATIONAL PERLITE CO., Campbell, Calif., has started the commercial production of expanded perlite, a volcanic rock of rhyolitic composition. According to President Jos. Fournier, six converters will be used in the plant to expand the perlite into a lightweight aggregate or other industrial purposes. Four deposits are now owned and additional deposits are being negotiated for.

Perlite-Synthetic Pumice

ALTHOUGH the subject of perlite (or pearlite) has received increasing attention over the past few years its physical properties, control of processing treatments, possible uses and exploration of deposits still offer a wide field for research and investigations. The Bureau of Mines is undertaking the gathering of data and the solution of these problems and a recent publication prepared by Oliver C. Ralston, assistant chief of the Bureau's Metallurgical Branch, records the present available information on perlite and its potentialities in various industrial uses.

It is stated that all of the known uses of pumice and pumicite can be filled by perlitic products and the proper heat treatment control will in turn control the degree of puffing, bubble size, wall thickness, bulk density and crushing strength. Perlite, as defined in the report, should include all siliceous lava containing dissolved water in sufficient amount to expand into bubbles when this material is quickly heated to a suitable point in the softening range, since quick heating is essential to get usable expanded perlite products. A suitable amount of water contained in "solution" is considered to range between 2 and 5 per cent.

One of the problems of the heat treatment of perlite is to momentarily superheat only the exterior of the granules producing a glassy-surfaced lightweight aggregate impervious to the intrusion of liquids or gases. Other technical problems proposed for research by the Bureau of Mines are weight per cubic foot and crushing strengths of different varieties of perlite when expanded under known conditions of firing control. Also to be determined is data on the coefficient of thermal transmission of a variety of perlite products of varying bulk density and varying steam-bubble diameter and the relative effect of the water content percentage on the expansion of the perlite.

Has Many Uses

Since the premise is set up that perlite can compete with any of the uses of pumice or pumicite, the uses of these materials are included in possible uses of perlite.

Ceramics—The use of pumice fines as a substitute for feldspar in ceramic bodies where color is not important has been given increasing attention and research as a market for the fines resulting from perlite plant crushing.

Bricks and Shapes—Brick, building block, roofing tile, sewer pipe, etc., have been made from perlite and pumice by adding a binder clay and cellulose and then molding and heating.

Acoustic Material — Acoustic slabs from expanded pumicite, acoustic plaster from gypsum stucco, oxalic acid and crushed marble and pumicite; acoustic gypsum wallboard using perlite filler; and acoustical paint using granular pumice are present uses of pumice and perlite as acoustic material.

Concrete Aggregate—This field is considered potentially the largest field of use for expanded perlite and related products. The ideal perlite granule would have a water resistant glassy surface with a maximum strength. Lightweight concrete for building construction and concrete block manufacturing are the most applicable uses at present with ready-mixed concrete subject to further investigation.

Thermal Insulation—Perlite has high promise for use as insulation filling around heating and refrigerating equipment as well as for insulating brick when its exact thermal technology is worked out.

Miscellaneous uses would be in the chemical industry and as lightweight foundry cores.

As compared to the competitive mineral products such as exfoliated vermiculite, pumice, bloated-clay granules, diatomite mineral wool, etc., it is claimed that perlite promises a greater all-around versatility. It has greater strength than most of its competitors, its density may be varied, it is fireproof, mildewproof, does not attract water, is fairly chemically resistant and, when properly heat treated, can be made waterproof.

Perlite is now produced in varying amounts at locations in New Mexico, Arizona, Nevada and California, and the Bureau of Mines intends to continue its exploration work in locating new perlite deposits.

The information circular bibliography lists some 25 reports of various nature on pumice, pumicite, and perlite. A free copy of this Information, Circular 7364 may be obtained from The Bureau of Mines, Department of Interior, Washington, D. C.

LABOR RELATION TRENDS

Industrial Peace by Contract

By NATHAN C. ROCKWOOD

AS CONSIDERATION AND DEBATE on proposed changes in the National Labor Relations Act and other New Deal labor legislation continues in and out of Congress, some employers are quietly, and in many cases effectively, acting to bring about more stable labor relations by collective bargaining. Facing the probability of unfavorable (to them) changes in the law, the members of National Labor Relations Board also have been showing a more reasonable and judicial attitude toward employers; in other words, the board has begun to recognize some rights of employers as well as those of employes.

Employer's Right to N.L.R.B. Election

One of the most radical changes in the National Labor Relations Board's attitude is a concession that an employer, who honestly doubts the authority of a union to represent his employes, may insist that union authority be proved by a N. L. R. B. election. That, coupled with the Board's recent recognition of the employer's right of free speech, to address his employes on the merits of any controversy between them, may go a long way to iron out some of the difficulties encountered in the past. Heretofore, all the union had to do to gain bargaining-power recognition was to exhibit cards signed by a majority of the employes. If the employer now has reason to doubt any of these, and he acts in good faith, he need not deal with the union until after N.L.R.B. conducted election.

If in the meantime the union calls a strike to attempt to force recognition, the employer is not bound to deal with it, and may solicit the strikers as individuals to return, without violating the N.L.R.A., or at least as it has hitherto been interpreted. Moreover, the employer under such circumstances is justified in "anticipatorily refusing" reemployment to strike leaders whose misconduct during the strike includes assaults on workers who are willing to pass the picket lines. However, the board made it clear that it would not countenance mere delaying tactics on the part of employers.

The case which brought forth this ruling involved only 17 employes of a small warehouse in Roanoke, Va., but the decision, if adhered to in subsequent cases before the N.L.R.B., may have far-reaching results. The employer, without explanation, refused to accept the union's offer to establish its majority status by a card check and insisted upon a N.L.R.B. election. The decision of the board in favor of the company reversed a finding by one of its trial examiners that in refusing to accord the union "statutory recognition," the company was guilty of an unfair labor practice within the meaning of Sec. 8 (5) of the N.L.R.A.

The company had offered to join with the union to expedite a solution, in a consent election under the board's auspices, but the union summarily rejected the proposal and without making further effort to reach an understanding withdrew from the conference with threats as to what would happen, etc. Thereafter an immediate strike was called, with the usual violence (International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers). Here then was an example of the employer acting in good faith and the union refusing to, and probably this is one of the instances which recently caused the board to come to the conclusion that employes as well as employers must act in good faith.

Contracts Not to Strike

The Bureau of Labor Statistics has issued a study of contract clauses designed to prevent strikes during the life of the contract, and recent rulings by arbitrators who have been brought in to interpret no-strike clauses, show a strong tendency to compel unions to live up to their contracts. This means, of course, that unions are now expected to make and keep contracts with more good faith than many have exhibited in the past. The penalties imposed on union officials who promote strikes, regardless, are such as to make them cautious of entering this kind of contract; and employers now have an excellent counter-proposal where union bargainers make excessive demands. However, the board has not gone so far as to uphold employers in an attitude of "no strike or no contract."

Usually, in exchange for a no-strike clause, employers are willing to include a no-lockout one. Some such clauses are designed merely to delay strike action until other methods of settling grievances have been exhausted; and some contain exceptions and outline specific conditions under which strikes may be called, as for example to enforce compliance with the terms of the agreement, or for refusal of the employer to arbitrate or to abide by the decision of an arbitrator. Some clauses permit a strike in a dispute over the general wage scale when the agreement permits the matter of wages to be reopened during the term of the contract. To attempt to prohibit strikes entirely by contract would of course make such contracts illegal, as no union has the power to surrender its members' guarantee of the right to strike under the N.L.R.A.

Penalties provided for violation of no-strike, no-lockout provisions of contracts must also apply to employers as well as employes. Penalties against individual strikers include discharge or suspension, loss of certain contractual benefits, fines, etc., and these may be made more severe against strike leaders than against other union members, who may be unwilling participants. Penalties against employers for violating no-lockout clauses include agreement to pay for lost wages, a fine, or other method of compensating the workers. Some contracts try to get around penalty provisions by the incentive of a bonus for the employes who refrain from joining an illegal strike.

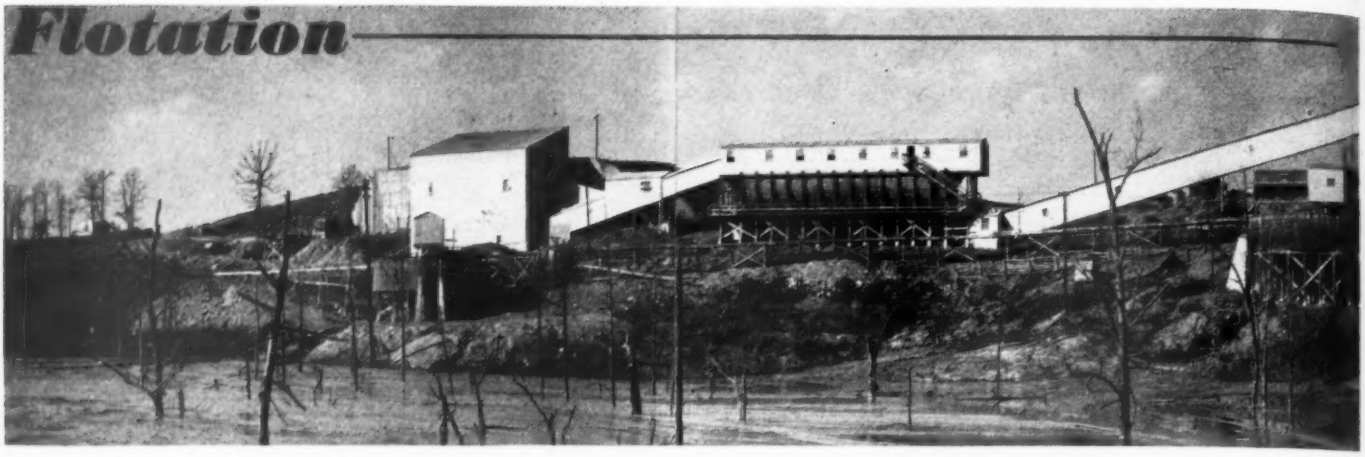
Naturally, there are many complicated situations, for example, what constitutes a strike? Does it have to be called by the union officials? What is the union's responsibility for an unauthorized strike? There is considerable basis for the position taken by some arbitrators that it is definitely the responsibility of a union to make its members fulfill its contract; and penalizing union officials for a breach of contract is justified even in the case of unauthorized strikes. Thus there is evidence of a trend toward upholding the responsibility of unions as well as of employers. The N.L.R.B. has begun to recognize cases in which the employer will not be compelled to reinstate strikers who quit work in violation of collective bargaining agreements. However, these three factors must exist in such instances: (1) the employer must not have had a hand in breaching the contract; (2) the strike itself was not called for the employer's violation of the N.L.R.A. (an unfair labor practice); (3) the strikers are refused reemployment because of their part in breaching the contract and not because of union membership.

Portal-to-Portal Pay by Contract

The Mt. Clemens Pottery Co. case which created such a furore is now dead and buried — the appeal was withdrawn from the Circuit Court of Appeals at Cincinnati, at the request of the union attorney, so that the U. S. Supreme Court will not have a chance to pass on the District Court's definition of what constitutes a trifling amount of overtime spent getting on the job. The union attorney's reason for asking withdrawal of its appeal from the District Court's decision was to avoid a Supreme Court decision that might spoil other suits, in which a court may rule that the time involved is not trivial. So, unless the Congress acts on this matter the issue is just about where it was.

In the meantime employers in some instances are making new collective bargaining contracts which cover travel and preparation time. The Bureau of Labor Statistics recently com-

(Continued on page 110)



Extensive plant facilities for the processing of barites operated by Baroid Sales Division of National Lead Co., Los Angeles, Calif.

BARITE Concentration

Part 7: Froth flotation invades the slime range to produce a high grade barite concentrate from extremely fine grained siliceous ores

By JAMES A. BARR, Jr.

BARITE CONCENTRATION by froth flotation dives headlong into that range of particle sizes from which, as non-metallics go, the research metallurgist would usually much prefer to investigate in a research laboratory or to talk about rather than to put into effect some of the unusual mineral preparation steps and materials handling circuits which are essential to the economic success of an operating mill.

It has seemed rather strange and disconcerting at times to leave that easy realm of particles generally trated in the early days of non-metallic flotation which started at about 28-mesh and stopped abruptly between 200-mesh and 325-mesh.

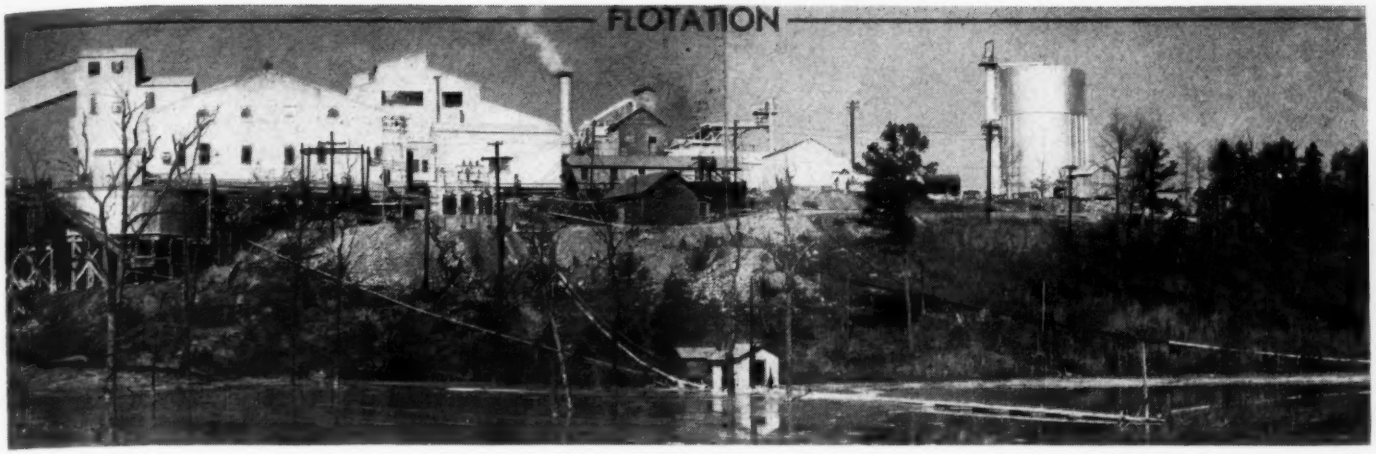
To enter into the slime range which until recently has been considered as starting at about 200-mesh has in many instances been exceedingly difficult. Not only do the materials handling problems present many challenges but also the ores and the minerals therein are often of such a nature that overgrinding must be practical in order to get an average liberation rather than the impossible complete liberation of mineral. There are often amongst the associated minerals soft minerals easily overground in spite of all precautionary measures or minerals which may have surface alteration, often in the order of 2 per cent to 10 per cent by weight, which is generally entirely different in chemical composition from the original mineral surface.

Barite until recently has been concentrated by mining a very high grade vein selectively or by taking advantage of its specific gravity (4.4-4.6) to concentrate the mineral by washing and jigging sometimes followed by selective grinding to further reduce the stained gangue minerals. Barite concentration by froth flotation methods is relatively new for it is only during the past six years that froth flotation has been again called upon to bridge the gap between depleted high grade sources and relatively abundant but low grade ores. Augmented by the flotation concentrates, barite has become one of our most important non-metallic minerals so beneficiated. Its use has been extended to include not only the processing of paper, pigments and chemicals but also the high tonnage consuming oil well drilling mud use which is essential to drilling through the earth's crust to an ever increasing depth in the search of oil.

There are many deposits which will be beneficiated by froth flotation methods, now that the trial and error period is about over relative to the efficient handling of mineral particles ground through 325-mesh and from between 10 per cent to 30 per cent minus 7.5 microns. Many of our fluorspar deposits contain small amounts of barite which is usually thrown to waste. There are also many sulfide mines which have barite in the vein rock from which the sulfide minerals are separated.

The cement rock, fluorspar and clay industries use many circuits which are similar to those which must be used for barite concentration since each separation is made in the presence of micron size particles. However, even with some previous experience to draw upon, the development of methods for concentrating a variable ore by several entirely different

Extensive stripping operations required to uncover barite which lies at about a 60 deg. angle



processes has not been easy and more than once it was necessary to wish for high roofs to accommodate voluminous froth which seemed to be almost uncontrollable.

The Magnet Cove Barite Deposit

The development of froth flotation processes for concentrating our most extensive and interesting barite deposits at Magnet Cove, Ark., has been shared by two successful companies, the Baroid Sales Division of National Lead Company and the Magnet Cove Barium Company. The deposit was recently described by O. J. Benston.* "Magnet Cove is located in northwestern Hot Springs County, in central Arkansas. The area gets its name from magnet crater, an igneous intrusive that surfaces with a crater like appearance. The ore formation lies in a series of synclinal folds that have been caused by a strong northwest thrust throughout the region. The synclines are noticeable topographically as novaculite ridges lying roughly northeast to southwest. The troughs of these synclines contain the Stanley shale formation consisting of numerous clays, shales and sandstone strata and portions of these troughs are mineralized with barites — this mineral consistently lying at or near the contact between the novaculite footwall and the shale hanging wall.

"The barites mineralization is heavy in some localities and usually occurs in lenticular masses. In the main Magnet Cove area, the deposit varies from 20 to 70 ft. in thickness and averages somewhat over 40 ft. The main ore body lies in the upper and eastern end of Chamberlain Creek syncline which is cut off by the Magnet Crater at its west end. The deposit here is roughly one-half mile long along the axis of the syncline, varying from nothing at the point of the axis, to three-eighths mile across the syncline at the western extreme of ore deposition, and from nothing at the east end to over 600 ft. depth at the west end. The ore is fairly continuous throughout and the formation is best described as spoon shaped. Originally it was thought that the Magnet Crater had a definite bearing on the formation of this ore body, but more recent investigations tend to show it as contemporary rather than causative. The mine is about seven miles due north of Malvern, Ark., by road a distance of 12 miles, and roughly half way between Malvern and Hot Springs."

*O. J. Benston, superintendent, Baroid Sales Division, National Lead Co. Mining Congress Journal, June, 1946.

The Ore

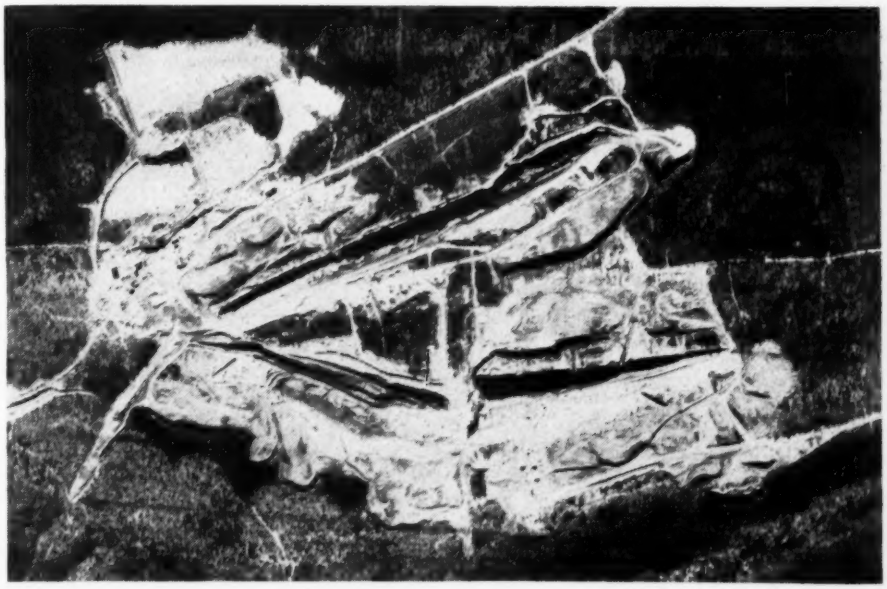
A typical high grade ore of this deposit has a specific gravity of 3.79; Barium sulfate, 70 per cent; SiO_2, 21 per cent; Al_2O_3, 6 per cent; Fe_2O_3, 1.2 per cent. The gangue minerals which are free silica, silicates in the form of clay and shale minerals have a specific gravity of 2.67. The iron is present usually as pyrite. Since the ore varies from about 40 per cent to 80 per cent barite, any successful process must be flexible enough to take the ore of all economical grades. Since the average ore is interlocked to about 400-mesh the general practice is to grind the ore to minus 325-mesh before flotation. Product grade requirements are for a 4.30 specific gravity concentrate which is water wettable and free of excessive amounts of acid forming minerals such as pyrite.

The Cationic Circuit

The Cationic flotation circuit offers many advantages since the minor minerals are rejected in a waste froth tailings. Often spoken of as the "upside down" method, this process takes advantage of the relatively new class of specific silica and acidic mineral collectors, the high molecular weight organic ammonias.

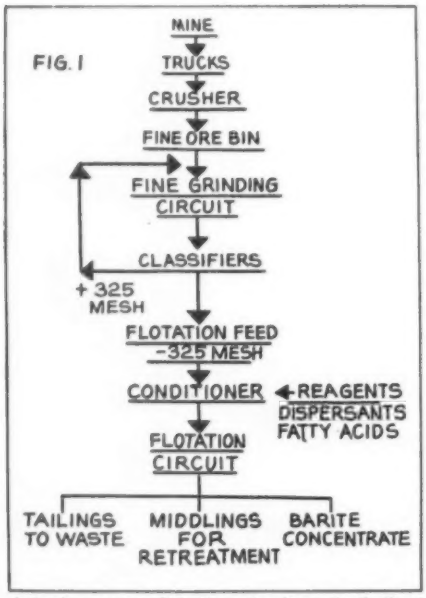
The nature of the sliming minerals is a very important factor in the success of a cationic circuit since all cationic reagents are consumed in economical amounts by the presence of substantial amounts of the hydrous aluminum silicates or clay minerals.

However, since this class of minerals disintegrate into particles approaching one micron in size it is possible to eliminate some of the interference by the use of a centrifuge which does a very good job of making separations of particles approaching one micron. It is well recognized that the centrifuge is a very important tool for making separations of particles in thick slurry form without the



Aerial photograph showing syncline in which barite is deposited. Both open mining with extensive stripping and underground mining is carried on by two different companies. To the left, open pit mining; and to the right, underground mining

Plant of Magnet Cove Barium Co., showing drag scraper to move ore into crushing and grinding section. Large thickener may be seen to the left



Anionic reagent flotation circuit to froth float barite from siliceous gangue minerals

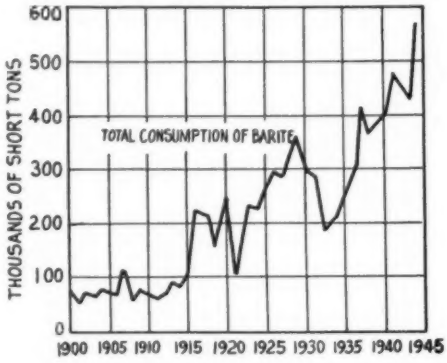
use of expensive deflocculants and enormous hydroseparators and thickeners.

Barite concentrated by the cationic reagents is readily wettable when it is made up into a drilling mud and does not require any high temperature drying to remove an organic film since all the organic flotation reagents are adsorbed by the clay and silica minerals.

The use of cationic reagents is not confined to the flotation of siliceous minerals from barite for by proper manipulation of the flotation reagents and circuit conditions the high molecular weight aliphatic amines can be advantageously used to separate an exceptionally high grade barite concentrate from the silica and silicate minerals.

Under proper conditions, the consumption of reagents is not excessive yet is somewhat higher than that required for coarse particle size separations. It is not unusual to effect the desired separation with between 0.25 and 1.00 lb. of reagent per ton of concentrated barite.

The extreme collecting power of the cationic reagents is well demonstrated by the fact that given proper conditions one pound of amine will float 16,000 to 20,000 lb. of mineral.



Curve showing the tremendous increase in the consumption of barite. (1944 Minerals Year Book)

The Fatty Acid Circuit

The fatty acid circuit which uses powerful deflocculating agents to separate the barite and siliceous minerals is less sensitive to slime conditions and excessive percentages of gangue minerals. This process, however, is much more subject to water conditions and soluble salts derived from calcium and iron minerals.

For this reason it is essential to adequately nullify the effect of the soluble salts or to eliminate them preferably by use of a centrifuge which can be used advantageously to dewater the ground mineral slurry and to separate a small weight fraction which has such extreme surface area and activity that it adsorbs excessive amounts of reagent and causes wild froth in the flotation circuit.

The fatty acid circuit is well developed and is used wherever the barite is to be concentrated as a froth product. Large amounts of barite laden froth must be handled since the barite represents 60 per cent to 80 per cent of the ore. Several cleaning circuits must be provided to eliminate gangue minerals entrained by the froth.

A high temperature drying operation is used to remove all hydrophobic films from the barite before a suitable drilling mud can be prepared.

Selection of the Reagent

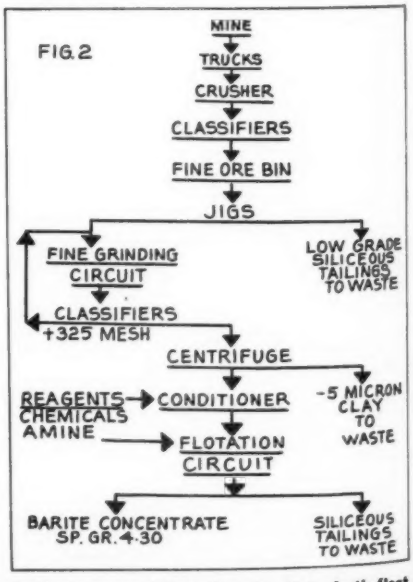
The use of either cationic amines or anionic fatty acids can be successfully adapted to barite ores. The use for which the mineral is concentrated and the associated minerals determine the process best suited for a particular separation.

With such a successful start in the treatment of siliceous barite ores it is reasonable to believe that the barite reserves in the form of many low grade ores will adequately supply our present and future needs. It is indeed a tribute to those men who foresaw the shortages and who aided by froth flotation transformed another rock on the side of a hill into a valuable industrial mineral.

CENTRIFUGE PERFORMANCE

Particle Size In Microns	Centrifuge Feed % Minus	Centrifuge Feed % Cum. Minus	Centrifuge Product % Minus	Centrifuge Product % Cum. Minus	Centrifuge Effluent % Minus	Centrifuge Effluent % Cum. Minus	Flotation Product % Minus	Flotation Product % Cum. Minus
7.5	15.93	15.93	15.93	15.93	77.00	77.00	8.26	8.26
10.0	6.55	22.48	6.55	22.48	2.60	79.60	5.42	13.68
15.0	14.67	37.15	14.67	37.15	4.50	84.10	11.53	25.21
20.0	14.58	51.73	14.58	51.73	3.15	87.25	15.97	41.18
25.0	11.26	62.99	11.26	62.99	3.03	90.28	15.95	57.13
30.0	7.24	70.23	7.24	70.23	—	—	11.92	69.05
35.0	6.93	77.16	6.93	77.16	1.46	91.72	8.12	77.17
40.0	5.12	82.28	5.12	82.28	1.69	93.41	5.31	82.48
45.0	1.46	83.74	1.46	83.74	5.74	99.15	3.03	85.51
50.0	4.85	88.59	4.85	88.59	0.85	100.00	3.64	89.15
55.0	1.78	90.37	1.78	90.37	—	—	4.02	93.17
60.0	1.95	92.32	1.95	92.32	—	—	3.00	96.17
+325 sieve	7.68	100.00	7.68	100.00	—	—	3.83	100.00
Surface Area	1565 sq. cm./gm		1220 sq. cm./gm		3872 sq. cm./gm		908 sq. cm./gm	

Particle size determination by the Wagner Turbidimeter Method.



Cationic reagent flotation circuit to froth float either siliceous gangue minerals or barite

Fit the Belt to the Job

Conveyor belt systems must be incorporated in the plant design with ample clearance, accurately aligned, and arranged for efficient feeding

By W. E. JOHNSON*

To the modern plant handling stone, sand and gravel and similar materials, the belt conveyor system is what a transportation system is to a nation, or the blood stream to a man, yet in many cases no other equipment is given less thought in the design of a plant or more abuse in the operation.

Too often conveyors are stuck into cramped places without enough head room at the loading and discharge points, belts are not properly aligned, skirt boards and chutes deliver the loads so that the cover becomes torn, enough clearance is not provided at the drives and the sides of belts are worn off. Often the correct belt is not purchased for a specified job. This can be avoided by consulting a sales engineer of any reliable maker of belts. He will recommend the right weight of duck, number of plies, tensile strength and covers, but cannot guarantee the belt if it is not taken care of after installation.

Laying Out Conveyor System

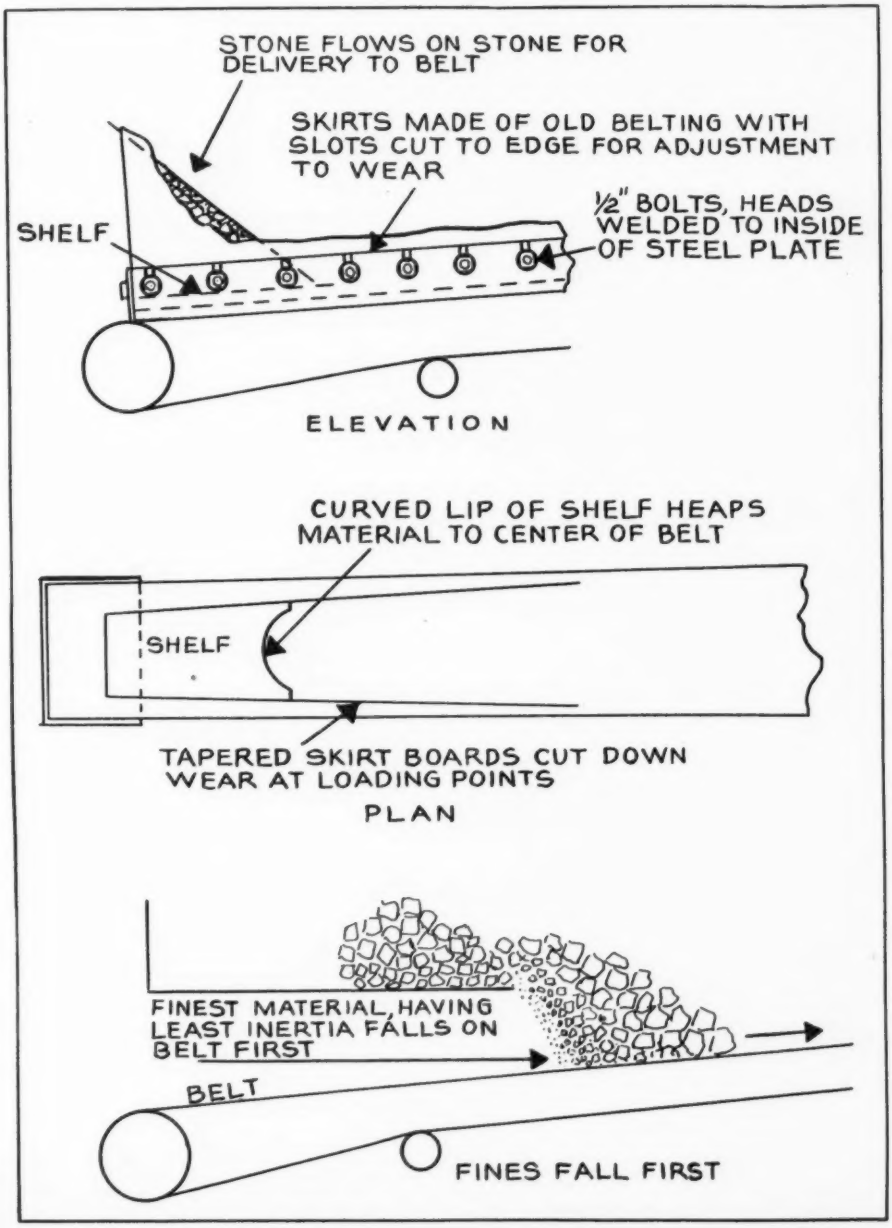
Within the past five years the writer has designed seven large stone crushing plants and the eighth one is being detailed. In laying out a conveyor a vertical curve is nearly always used, especially if the main part of the conveyor goes up to an inclination of as much as 12 deg. This permits loading the material on the belt at a flat angle, preferably about 6 deg. Large pieces delivered to the belt immediately settle down, do not roll back or twist against the skirt boards wearing the top cover.

At the Greystone plant of The Southern Aggregates Corporation the "A" conveyor is 42 in. wide and 555 ft. centers. It starts with an inclination of 6 deg. and is brought up to 19½ deg. in chords of 10 ft. and deflections of 3 deg. Of course the last deflection is 1½ deg. This curve under some conditions would be too short, as the radius figures approximately 191 ft., but it starts at the tail pulley at the beginning of the load and shows no inclination to lift from the carriers.

This conveyor takes the product from a 48- x 60-in. jaw crusher set at right angles to the belt. Eleven feet is allowed for a stone box, permitting the crushed material to come out from the crusher and turn in the direction of the belt travel. The feed chute is tapered, beginning 24 in. wide and tapering to 34 in. at the end of the skirt boards, so that any piece of stone coming in contact with the belt immediately moves away from the skirt board and does not roll against it.

The proof of the soundness of the design of this conveyor may be seen

(Continued on page 106)



Showing how conveyor belting is protected

* Consulting engineer, Raleigh, N. C.

Non-metallics Occupy Important Place In A.I.M.M.E. Anniversary Program

American Institute of Mining and Metallurgical Engineers holds 75th anniversary meeting in New York

By OLIVER BOWLES

A father and son combination, James A. Barr, Jr., Armour & Co., left, and James A. Barr, Sr., International Minerals & Chemical Corporation

CELEBRATING the 75th anniversary of its establishment in 1871, the American Institute of Mining and Metallurgical Engineers held its Jubilee meeting in New York, March 17 to 22. This was one of the largest meetings the Institute has ever held. Rumors were afoot that registration at headquarters in the Waldorf-Astoria Hotel might exceed 3000. The first three days were devoted primarily to the broader phases of world mineral resources and economics, forecasts of mineral technology of the future, and—subjects of critical interest to everyone—the control of atomic energy, its development, and its application to peacetime industry. Many representatives of universities and scientific societies in foreign countries contributed discussion that emphasized the international scope of this important gathering.

The heavy products of construction —stone, sand, and gravel, clay products, cement, lime and gypsum, in which the readers of ROCK PRODUCTS are primarily interested, although of enormous importance in the economy of any country, are not generally of critical significance from an international standpoint, because relatively small quantities of them cross international boundaries. Nevertheless all mineral producers are interested in our degree of self-sufficiency in essential mineral products.

SECRETARY OF THE INTERIOR, JULIUS A. KRUG, commented upon the serious situation that exists because of the rapid depletion, during the recent war, of the known reserves of several important minerals, and he pointed out three directions in which steps should be taken to remedy the situation: first, a more intensive search for mineral deposits, and improvements in the technique of their mining, preparation and utilization; second, acquisition from foreign sources of minerals of which our domestic supply is inadequate; third, accumulation of stockpiles of essential minerals and their primary products. Improvements in the technique of exploration may assist definitely the expansion of our known mineral reserves. Both the domestic and the world situation with respect to individual mineral commodities were stressed by authoritative representatives of industry, but metals and fuels held the spotlight in these deliberations.

Of interest to all mineral producers was an address by C. AUGUSTUS CARLOW, Director of the Fife Coal Company, Scotland, on the world-wide coal situation. Coal will constitute the world's chief source of power for many years to come, and although the overall reserves may be regarded as stupendously large, from the standpoint of high quality, and economic availability to meet the industrial competition of other sources of heat and power, Mr. Carlow predicted that they will prove to be perilously small. Therefore, he urged the need of the greatest possible conservation on the part of mining engineers and consumers.

The proceedings of this historic meeting together with a history of the Institute since its establishment, and a 75-year history of the mining industries will appear in a memorial volume of the Institute Transactions.

On Tuesday evening, March 18, the new Board of Directors of the Institute held its initial meeting with PRESIDENT CLYDE WILLIAMS, Director of Battelle Memorial Institute, in the chair. The interests of industrial (nonmetallic) minerals are upheld by four board members — William W. Mein, Sr., District 13; H. J. Brown, District 1; Oliver Bowles, District 2; and J. L. Gillson, Chairman of the Industrial Minerals Division, ex-officio member of the Board.

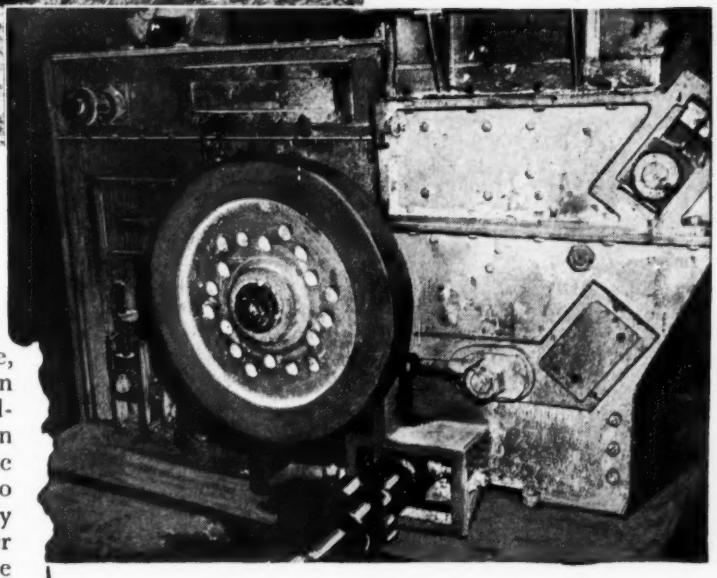
The program during the last half of the week consisted of papers on new equipment, processes, products and developments in many branches of the mining industry. The Industrial Minerals Division held sessions alone and in conjunction with the Milling Methods Committee, the Mining Methods Committee, the Mining Geology Committee and the Society of Economic Geologists.

The Mining Methods sessions emphasized a number of new and interesting developments. In the open-pit mines in the Minnesota iron ore region recent comparative tests have demonstrated that butane offers certain advantages over Diesel oil for trucks used in ore haulage. The butane costs much more per gallon, but it increases considerably the power generated. As the butane is supplied as a gas or vapor, crank cases need not be drained whereas with diesel oil frequent drainage is required. Overall comparative costs are about the same but when butane is used there are definite advantages in smooth running, better control, greater power, and lower maintenance expense. Data on this subject were presented by A. C. BUTTERWORTH, chief mechanical engineer of Picards, Mather and Company.

Drilling

At a symposium on bore-hole drilling, several important papers were presented, bearing on the most efficient types of equipment to be used, and the best methods to employ under various circumstances. LEON W. DUPUY of the Bureau of Mines, outlined the fundamental factors in exploratory diamond drilling. The recovery of cores is often of great advantage in determining the quality and character of rock formations. With the diamond drill, holes may be projected at any angle, and several holes may be drilled from one set up. Satisfactory cores can be recovered only from firm consolidated rock. Contract drilling is most desirable except where the operating firm has experienced drillers on its own staff. Before a contractor can make an intelligent bid on any project he must have complete information as to the nature of the rock, depth and size of holes, accessibility, availability of water supply and various other factors. Details as to the types of drills used, bit specifications, single-tube and double-tube core barrels, rods, casings, cementing of drill holes, use of drilling muds, preparation for drilling, and conduct

HIGH MOISTURE CONTENT *Won't Stop a* DIXIE



Dixie Hammermill's Greater Efficiency Demonstrated at Mississippi's Lime Plant No. 2

Far from being hard and brittle, the limestone in the Selma formation is soft and sticky and correspondingly difficult to pulverize. Even with average moisture present in the stone, the material has a tendency to clog most crushers, and it was only after considerable study of a number of different make machines that the present equipment was adopted.

Dixie 36 x 40 inch Non-Clog Hammermill with Patented, Exclusive Moving Breaker Plate in operation at Mississippi's Lime Plant No. 2, Cedar Bluff, Mississippi.

Wet, sticky material presents numerous operating difficulties to ordinary hammermills. Choke-ups often result, production may be slowed, costs can increase and profits dwindle.

But with a Dixie Non-Clog Hammermill on the job, it's a different story. A case in point is the Dixie Hammermill installation at Mississippi's Lime Plant (No. 2). Here the moisture content in the feed stone makes it soft and sticky . . . yet there is no clogging. For, in a Dixie, the breaker plate is a continuously moving belt of manganese steel links. Material is carried by positive, mechanical feed to the hammerpoints and then on through the grates. There are no delays in production . . . output is greater . . . quality is improved . . . drying costs are lower.

If you have wet, sticky material to crush, if you have difficulty reaching and maintaining desired production, ***if you have any crushing problem at all*** . . . it will pay you to apply this improved crushing principle to your needs. Write today for full information and catalog.

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of drilling operations will appear in a Bureau of Mines publication on this subject now in press.

J. R. THOENEN of the Bureau of Mines covered another phase of drilling, namely, churn-drill performance. Reference was made to the numerous variable factors in churn-drill operation in their relation to accomplishment. The principal factors are, character of rock, weight of drill tools, length of stroke, number of strokes per minute, diameter of bit, quantity of drilling water added, and the specific gravity of the sludge. Following are some of the more definite conclusions reached. The specific gravity of the sludge should be about 70 per cent of that of the rock being drilled. Lengthening of the stroke increases initial performance, but with elapsed time the drilling rate equalizes regardless of stroke length. An optimum tool weight per inch of bit diameter can be attained beyond which little or no advantage can be gained. Drill speed has only minor effects on drill performance. The length of hole drilled in a given time varies inversely with drill diameter. The angularity or sharpness of the cutting edge of the drill bit has only a minor effect on drill performance. The tests on which these conclusions are based were made in a uniform granite deposit on the property of the Consolidated Quarries Corp., Lithonia, Ga. Details of the tests with many tables and charts appear in Bureau of Mines R. I. 4058 entitled "Churn Drill Performance," a copy of which may be obtained from the Bureau of Mines, Washington 25, D. C.

A series of papers introduced by H. W. MONTZ on drilling in the anthracite region of Pennsylvania, brought out certain features of interest to all quarry operators. The three principal types of drills used are diamond, churn and shot core drill. Diamond drills are generally used for holes less than 4 inches in diameter, and for all off-vertical holes. The first diamond drill was used in 1863 and was hand powered. Steam power was introduced later and was used for many years. Gasoline, electric and air motors were still later developments. The earlier bits were set with carbonados (black diamonds) and were very expensive. About 15 years ago bortz diamonds began to be substituted extensively for black diamonds with a very great saving in cost. A 2-in. 8-diamond bit set with carbonados costs about $2500, whereas a bit of the same size set with a larger number of small bortz diamonds costs only about $75. The latter type can be run at much higher speed.

The shot or calyx drill is more economical than the diamond drill for vertical holes 4 inches or more in diameter. The first drills using steel shot as abrasive were rotated by hand or by horse power. Diesel, electric or gasoline drives are now employed. Shot drills operate best in uniform rock of medium hardness. Holes may be made up to 6 feet in diameter.

Churn drills may be employed for sinking proving holes, ventilation openings, cable openings or holes for blasting. Proving holes may later be used as blast holes. Churn drills are useful in exploring the extent of stripping and to delineate the boundaries of economical stripping depth. Sometimes it becomes necessary that the direction of drill holes be controlled accurately, and in the anthracite region devices have been perfected for this purpose.

The Mining Methods Committee also devoted considerable attention at its own sessions to drilling problems. Several authors discussed the use of large core barrels. Drilling and blasting practice in various mining centers were also discussed, but the papers on these subjects are not available at this time.

Blasting.

A new trend in secondary blasting both in stopes and open pits is the use of shaped explosive charges. The successful use of shaped charges in the recent war, particularly in assaulting pillboxes and other concrete emplacements led engineers to explore their application to mining and quarrying operations. It has been found that there is an optimum ratio of charge diameter to charge height above which the increase in effectiveness of the blast decreases greatly. Partial confinement of the charge makes its performance more consistent. High-power explosives are much more effective in fixed charges than are explosives of low strength. Cases for confining the charges are made of aluminum, lead, steel or other metals. Concrete cases for use in open pit quarries were tried but were less satisfactory than metal. Further details on this new departure in blasting will be found in A.I.M.E. Technical Paper 2157 "Studies of the Design of Shaped Explosive Charges, and Their Effect in Breaking Concrete Blocks," by George B. Clark of the University of Illinois.

Mining

MICHAEL J. MESSEL of Vermont Asbestos Mines pointed out the various factors that must be considered and the steps that should be taken in the examination and valuation of an asbestos deposit. This is a particularly difficult problem because one must determine not only the quantity of fiber per ton of rock that can be recovered, but he must know the length and strength of the fiber and the percentage of the various classes obtainable. Diamond core drilling is an important part of the exploration program.

WILLIS P. MOULD of Rock of Ages Corp. described the methods and equipment used in sawing granite with a single-strand wire saw. Although granite is an extremely hard rock, a cutting rate as high as 45 sq. ft. per hour has been attained when six parallel cuts are made simultaneously with a single wire. This is a new departure in granite cutting that has a promising future.

HUGH S. SPENCE of Ottawa, Canada, presented a paper on the Purdy Mica Mines, Ontario, that produced large quantities of electrical mica during the recent war. A unique feature of the deposit was the occurrence of a single crystal of muscovite mica measuring 9½ by 7 ft. by 3 ft. thick that yielded about 7 tons of trimmed sheet mica.

Milling

The various sessions on Milling Methods were of interest to all those concerned in reduction of stone to sieve and sub-sieve sizes. J. F. MYERS (Tennessee Copper Co.) and S. D. MICHAELSON and F. C. BOND (Allis-Chalmers Manufacturing Co.) presented data on rod milling collected at many plants in the United States and Canada. Grinding efficiency was calculated on the basis of electrical energy required (1) per unit of new surface area obtained, and (2) per unit of product-size material produced (material smaller than the micron particle size passed by 80 per cent of the mill product). Following are some of the more important of their conclusions. Rod mills show their highest efficiency when grinding the harder ores. Mill diameter and mill speed have little effect on efficiency. Grinding to a finer size increases the product-size efficiency, and decreases the surface-area production efficiency. Further deails are given in Technical Paper of the A.I.M.E. No. 2175 "Rod Milling—Plant and Laboratory Data."

It is well known that calcination improves the grindability of minerals. Calcination of potter's flint to facilitate grinding has been employed for many years. Tests were recently made at Battelle Memorial Institute as reported by D. W. SCOTT on the effect of calcination on the grindability of aplite rock quarried in Virginia, chiefly for use in glass manufacture. It was found that calcination increased the grindability of the aplite about 400 per cent. However, when the quartz and feldspar constituents of the aplite were calcined separately the increase in their grindability was much smaller.

E. R. JOHNSON outlined progressive improvements made in the crushing section of the Braden Copper Co. plant at Sewell, Chile, since 1921. These improvements have increased daily mill output from 20,000 to 30,000 tons. The successive changes with descriptions and flow sheets appear in Technical Paper 2150 of the Institute entitled "Crushing Practice at the Braden Copper Company."

Heavy-media separation is a process recently employed successfully at

Gulf Quality Lubricants and Fuels

help contractor keep ahead of schedule on water supply project !

Intercounty Construction Corp., Hyattsville, Md., has the contract to lay a 30-inch cast iron water line from High Bridge, Pa., to Lebanon, Pa., a distance of 20 miles. The line is being laid over rough terrain, and at points the trench is 16 feet deep.

"ALL-WEATHER PROTECTION with Gulf lubricants and the fine performance of Gulf fuels are playing a big part in our rapid progress on this job," says M. F. DiNova, Superintendent of Intercounty Construction Corp. "In spite of day-to-day changes in service conditions, our equipment is operating efficiently, and we have steered clear of delays caused by mechanical troubles."

On all types of construction projects, Gulf quality lubricants and motor fuels are helping contractors to a speedier, more profitable job. They work as a team to insure top-notch equipment performance, fewer delays, and lower maintenance costs.

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Left to right: Secretary of the Interior Julius Krug; Louis Cates, retiring president of A.I.M.M.E.; Clyde Williams, new president; and Sir William Fraser, chairman, Anglo-Iranian Oil Co., Ltd.

several plants where nonmetallic minerals are concentrated. Those employing, or contemplating the use of such a process may be interested in a presentation by E. H. CRABTREE of the Eagle-Picher Mining and Smelting Co. on comparative tests of galena and ferrosilicon for such use. Comparisons were made of actual mill operations over periods of many months. Ferrosilicon evidently gives better results than galena, particularly in the higher grade of cone concentrate obtained, in lower costs, and in better handling of muddy ores. (For further details see A.I.M.E. Tech. Pub. 2181, "Comparison of Galena and Ferrosilicon in Heavy-Media Separation.") Enid C. Plante of Australia outlined comprehensive tests made on the flotation of fluorite to obtain an acid-grade product containing 96 per cent or more fluorite, and less than 1 per cent silica. It was found that sodium cetyl sulfate has certain advantages over oleic acid, the chief of which is the lower temperatures that may be maintained.

As flotation is now applied to quite a variety of nonmetallics, including cement raw materials, the following additional papers presented at a session on flotation testing may be of interest: T. P. 2081, "Principles of Flotation — Flotation of Cassiterite and Associated Minerals" by H. F. A. HERGT, J. ROGERS and K. L. SUTHERLAND; and T. P. 2082, "Principles of Flotation—Activation of Minerals and Adsorption of Collectors" by J. ROGERS and K. L. SUTHERLAND.

Miscellaneous Papers

J. F. MYERS and R. J. TOWER of the Tennessee Copper Co. presented a collection of many useful ideas on milling that are of interest and value to all operators of mineral treatment plants. They relate to the operation of crushers, belt conveyors, ball mills, screens and many other types of milling equipment. Obviously such a paper cannot be abstracted. The report entitled "Symposium on Milling Devices and Practices" has been published by the Institute as Technical Publication 2162.

A diverse group of interesting papers were presented at a general session. The first was a paper by ROBERT D. PIKE on a process developed during the late war for recovering both magnesia and calcium carbonate from a pure dolomite occurring near Luckey, O. The magnesia was dead-burned for refractory use and the byproduct lime carbonate was suitable for use in paints or as a whiting. A detailed discussion of the process with flow sheets appears in A.I.M.E. Tech. Pub. 2155 entitled "Process for Manufacture of Dead-burned Magnesite, and Precipitated Calcium Carbonate from Dolomite."

G. W. JOSEPHSON of the Bureau of Mines, who spent four months in Germany after the close of the war presented interesting data on progress made in Germany toward manufacture of synthetic sillimanite. Prior to the war, Germany, like the United States, was dependent upon Indian kyanite for its raw material used in making mullite refractories. Although considerable stocks had been accumulated, depletion of the supply made it imperative that a process be developed for making sillimanite artificially. The raw materials used were clay, aluminum trihydrate, fused alumina and minor quantities of feldspar. The mixture was calcined in a tunnel kiln. The product was of fair quality but the cost was about three times as great as that of delivered Indian kyanite.

NELSON SEVERINGHAUS of the Consolidated Quarries Corp. described recent trends in the utilization of waste stone from Georgia quarries. Waste marble is manufactured into whiting products. Waste limestone is ground for agricultural use. The large piles of waste granite are now being used for making concrete sand, engine sand and chicken grit. Deister classifiers are used to remove the fines. By grinding waste granite to an extremely fine powder, the potash of the feldspar may be rendered available as a plant food. Marketing byproduct aggregates in the south is more promising than in New England where there is an abundance of sand and gravel aggregates of glacial origin. Considerable laboratory work has been done at Lithonia, Ga., on froth flotation of granite fines to produce mica, feldspar and quartz concentrates.

CHARLES L. HARNESS of the Bureau of Mines outlined the present scope of the earth pigment industry. Although synthetic pigments are attaining growing importance, they have by no means displaced the natural pigments, the production of which approximate 60,000 tons annually. Many refinements have been developed in the preparation of natural pigments, and many improvements have been brought about in their calcination and grinding.

A session devoted to Nonmetallic Mineral Deposits was largely geological in its scope. Some of the subjects covered were the more common defects and variations in muscovite mica, the zonal structure of pegmatites in its relation to the extent and continuity of feldspar deposits, the properties of "Indianite" clay, and a description of the talc deposits near Gouverneur, N. Y. The latter are quite extensive. It is claimed that reserves of 1,800,000 tons have been blocked out and 3½ million tons are reasonably assured. The magnesite deposit at Gabbs, Nev., which was of great importance during the recent war was described. It appears that the magnesite occurs near the contact of granodiorite with dolomite. Brucite occurs right at the contact. A discussion of barite, galena and sphalerite in the circle and sink deposits of Missouri emphasized evidence in support of their hydrothermal, as opposed to their meteoric origin.

Industrial Minerals Division

At the annual meeting of the Industrial Minerals Division held on March 20, it was announced that during the present year a volume of the Transactions devoted to industrial minerals would be published. The retiring Chairman of the Division, Oliver C. Ralston, Chief Metallurgist of the Bureau of Mines, commented on certain important trends and developments in nonmetallics. Among them are the extensive use of titanium dioxide pigments, and the growing use of light-weight aggregates in building construction. Reinforced concrete in which lightweight aggregates are used may be employed to extend the height of buildings without the necessity of reinforcing foundations. Some of these lightweight building products may be sawed and nailed like lumber. Perlite and vermiculite are attaining greater prominence in the lightweight field. Interest is increasing in bloated clays and shales, obtained by calcination after the addition of a "baking powder" (graphitic shales or iron oxide). The new Chairman of the Division, DR. JOSEPH L. GILLSON, of the Geological Development Department of the du Pont Company, took office at the meeting.

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FOR CHOOSING
McLANAHAN
SINGLE ROLL
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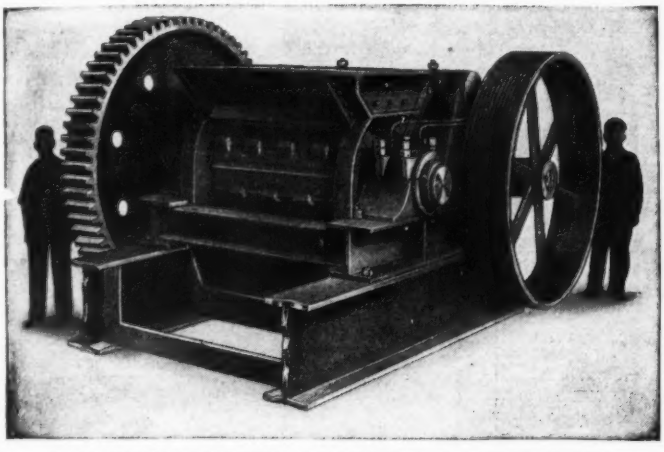

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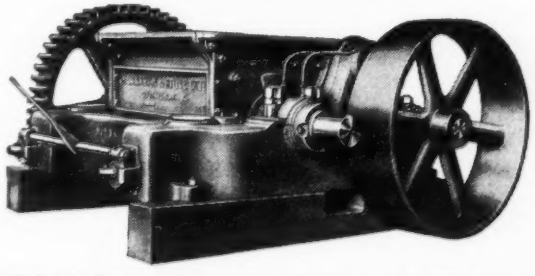

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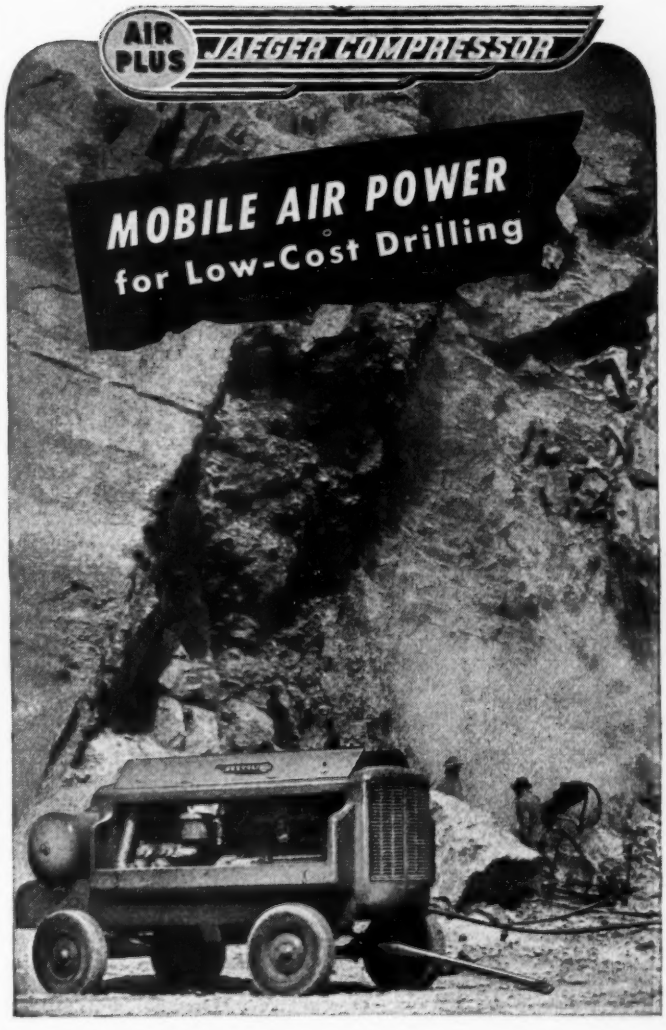

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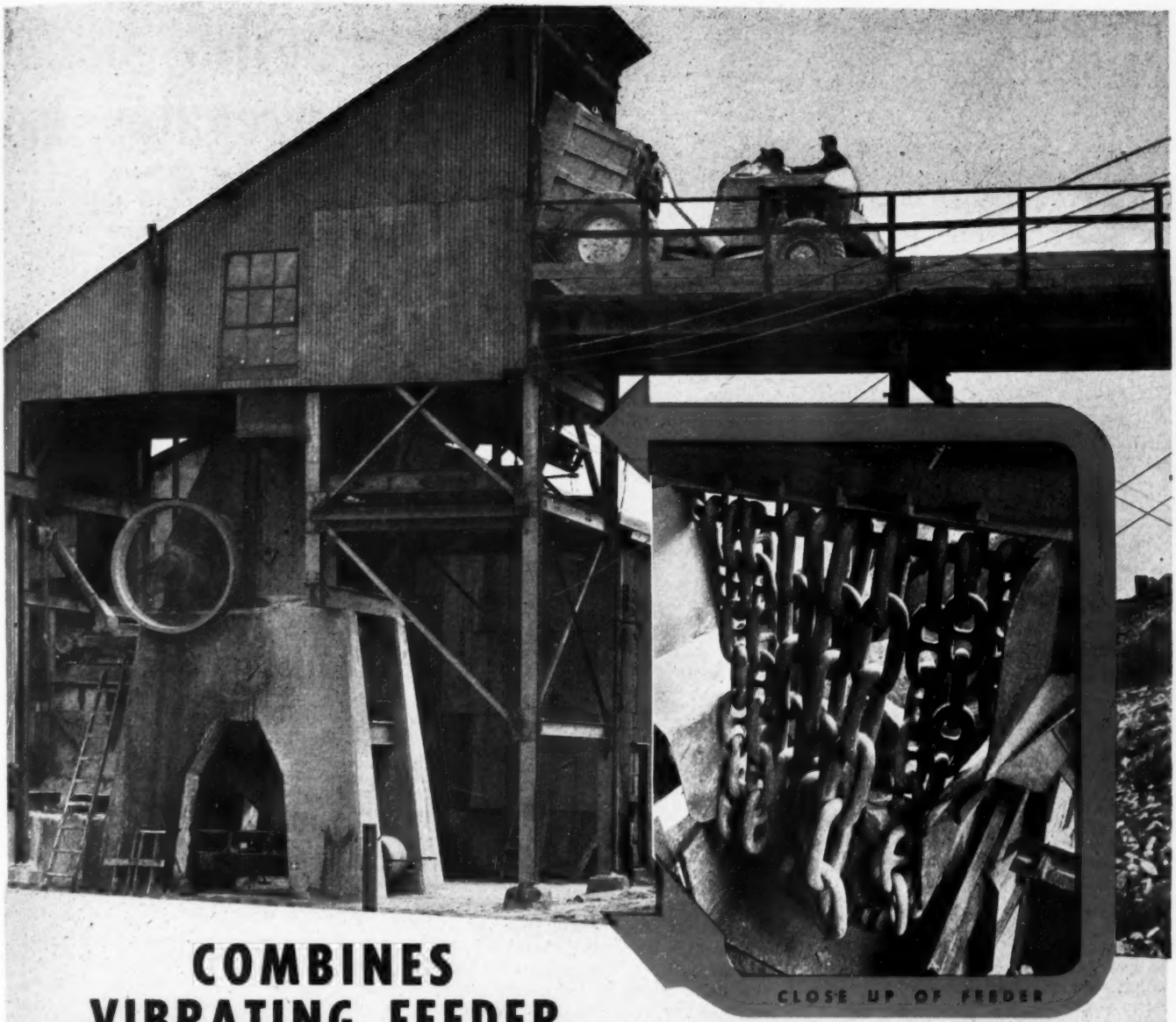

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Jeffrey-Traylor Electric Vibrating Grizzly Feeder handling run-of-quarry material and by-passing fines ahead of crusher.

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Complete Line of Material Handling, Processing and Mining Equipment

Conveying

(Continued from page 95)

by pieces of stone triangular in shape with a base not over half the length coming up the belt standing on end.

Further proof is that a belt 8-ply, 3500-4000 lb. tensile, 20-24 lb. friction, 32 oz. Duck, ¼- x ⅛-in. step top cover carried 3,000,000 tons of stone, elevating it 170 ft. This record of course has been beaten many times by belts under more favorable conditions where the load was carried flat or elevated very little.

Loading Conveyor

In delivering stone to a conveyor belt it is desirable to get the finest material on first, in order to provide a cushion for the larger pieces. This is the easiest thing to do in plant design, as the trajectory of the fines is always shorter and steeper than the coarse material, as there is less inertia built up in the smaller particles. It is only necessary to let the material pitch a few inches, always in the direction of the belt travel.

One of the worst crimes the writer has ever seen committed against a belt is to put guide rollers on the load side. Remember the load side, we will get to the return side later. There is no excuse for not running the load side of a belt straight, regardless of how long the belt may be. Makers of conveying equipment now build the troughing carriers inclined to the travel of the belt. This toes the outside carrier rolls in, and when a belt climbs up on one side the axes of the outside rollers, being inclined slightly to the center line, push the belt gently back into place. The rollers are not toed in enough to damage the belt cover. If troughing carriers are used which are not pitched forward, one or two cut washers may be slipped under the frame on the side nearest the tail pulley.

On a very long narrow belt, training carriers may be used at intervals of about 100 ft., but it should never be necessary to space them closer.

Use Care in Aligning Belt

When a very long belt is installed it may take as long as a week to get it properly aligned and running right. This time, or whatever time is necessary, should be spent as it will surely pay in the operation later. Even though all carriers and idlers are in perfect alignment the belt may have places where one side is longer than the other, or it may not lay in a straight line if unrolled on a flat surface. In training the "A" conveyor belt at Greystone, four guide rollers were installed on the load side until the belt had been brought under control, then they were taken off. Guide rollers were installed on the return side and left there. The belt was trained to run as nearly straight as possible, and would come gently against the guide rollers, running

there for several seconds, sometimes perhaps as much as half a minute, then move back toward the center. At no time was there so much pressure against the roller that it could not be held from rotating by pressing a thumb against it.

Loading Chutes

Particular care should always be used in laying out loading chutes or stone boxes. Enough head room should be allowed so that the material going on to a belt should engage the belt in the direction of travel. If a turn in the direction of flow through the plant has to be made a stone box should be provided and the stone or other material should slide over like material and not down a steel chute so as to reduce the velocity going onto the belt.

Skirt boards should be used only to get the load started, and should be made of steel down to about 1½ in. of the belt, then fitted with strips of old belting on the outside of the steel right down to the belt cover. They should always taper outward to the direction of travel.

As the material is broken down from the primary stage, belts become narrower at each reduction to the point where the material approaches liquid, less width is needed, but the full capacity of the belt is almost never reached. For instance, a 12-in. belt has a rated capacity of 69 tons per hour of 100 lb. per cu. ft., with material having 2-in. lumps, at 300 ft, per minute, but how is this much material going to be loaded on a 12-in. belt without too much spillage? We might do it by installing skirt boards all the way, but could not expect to get anything like the service that had been built into the belt because pieces of stone would rotate against the skirt boards and wear the cover off. So the sensible thing to do seems to be to install a wider belt, cut out the skirt boards and reduce the speed, thus increasing the life of the belt in several ways. The savings thus effected would soon pay for the difference in the cost of the larger installation.

Tail pulleys should never be jammed into places where the take-ups are hard to grease and inspect, or where spillage cannot easily be cleaned up; in fact, there should be no spillage, but this ideal condition is seldom achieved. The return side of the belt should be protected from spillage; if not, large lumps may punch holes through it at the tail pulley or fine material may build up a false crown and cause the belt to run against supporting structures and wear the sides off.

There is nothing that will make a superintendent or operator pull off his hat, throw it down and jump on it and cuss any quicker than to have a belt ripped from one end to the other, but there are many other ways to shorten its life just as surely and effectively.

Chemist Corner

(Continued from page 81)

High Purity calcium carbonate will detect errors in technique and contamination of reagents if compared with sodium oxalate values.

Determine magnesium on filtrate from calcium oxalate precipitate in accordance with section 36.

Determine loss on ignition in accordance with section 20c.

Ignite residue from loss at 2200 to 2400 deg. F. Determine Fe_2O_3 in accordance with sections 10 and 11, except use barium diphenylamine sulfonate for indicator (Eastman chemical No. 3104). (See article on page 109, January, 1946, issue of ROCK PRODUCTS on this subject.

Typical analytical results in duplicate on a limestone sample are as follows:

	1	2	Blank
SiO_2	2.92	2.96	0.02
R_2O_3	1.66	1.54	0.04
CaO	48.37	48.51	*
MgO	4.29	4.22	0.10
Loss	42.28		
Fe_2O_3	0.45		

*Note: Standardization includes Blank, special $CaCO_3$ + all reagents used to determine permanganate factor.

Discussion:

The ammonium chloride method for silica[6] has been used for several years with excellent success by many well known laboratories. My experience over a long period indicates that the method recovers more silica and the HF corrections are almost without exceptions lower. Since no fusion mixture is used in this method, the contamination of precipitates is slight and only if extreme accuracy is required is double precipitation other than that of R_2O_3 necessary.

Under favorable conditions a first class analyst can report SiO_2, Al_2O_3, Fe_2O_3, CaO and Loss within two hours or determine these elements on 6 samples in an 8-hr. day.

For comparative purposes the following determinations were made on Bureau of Standards argillaceous limestone sample 1A:

SiO_2 in R_2O_3 was recovered from R_2O_3 by fusing with small quantity of potassium pyro-sulphate dissolving in 1 to 1 HCl solution (volume kept small), filtering, washing and igniting residue.

The smaller corrections indicate the superiority of the ammonium chloride method for silica. However, both methods are in good agreement when the corrections are applied.

Conclusion:

A modification of A.S.T.M. alternate method for cement is presented which is rapid and gives fairly accurate results when applied to limestone analysis.

References

[1] Where section numbers are mentioned they refer to A.S.T.M. designation (C114-46).

[2] If material gains weight on balance spread sample in a thin layer exposed to laboratory air for 10 min. This generally reduces the rate of gain to the point where a reasonably accurate weighing may be made. Run moisture on this sample, calculate to oven dry basis if required.

[3] If sample contains more than a few tenths of 1 per cent of sulphide, ignite at 1600 to 1700 F. in open crucible in an electric furnace 30 to 40 minutes before heating at higher temperature. If presence of sulphide is suspected ignite 1 gr. at 1600 to 1700 F. for 1 hour and determine SO_3 in accordance with section 16

BUREAU OF STANDARDS SAMPLE 1A
ARGILLACEOUS LIMESTONE CHECK ANALYSES

	SiO_2 by double evaporation		SiO_2 by NH_4Cl method		Certificate average
	Analysis made Sept. 8, 1945		Analysis made Dec. 4, 1946		
% SiO_2 (as weighed)	14.33	14.18	14.10	14.12	
HF residue	—0.33	—0.26	—0.04	—0.06	
SiO_2 recovered from R_2O_3	+0.14	+0.16	+0.10	+0.10	
Blank	—0.05	—0.05	—0.02	—0.02	
% SiO_2 Net	14.09	14.03	14.14	14.14	14.11
% R_2O_3 (as weighed)	6.16	6.14	6.30	6.30	
SiO_2 in R_2O_3	—0.16	—0.19	—0.10	—0.10	
HF residue from SiO_2	+0.26	+0.25	+0.04	+0.06	
Blank	—0.12	—0.12	—0.08	—0.08	
% R_2O_3 Net	6.14	6.08	6.16	6.18	
Fe_2O_3	1.62	1.65	N.D. use 1.63	N.D. Use 1.63	1.63
By difference Al_2O_3 + P_2O_5 + TiO_2	4.52	4.43	4.53	4.55	4.46
CaO + SrO	41.47	41.48	41.40	41.26	41.44
% MgO as weighed..	2.32	2.30	2.11	2.15	
Blank	0.13	0.13	0.09	0.09	
% MgO Net	2.19	2.17	2.02	2.06	2.19

Note: All samples ignited at 2200 to 2400 F. in covered platinum crucible without fusion mixture to render soluble in hydrochloric acid.

except add 2 to 3 ML bromine water to first filtrate. If total sulphur thus determined is considerable apply same method to raw sample to determine sulphate present. Do not use bromine in this determination.

[4] Ammonium chloride solution will become acid on boiling, add a few drops of methyl red to solution and ammonia drop by drop to dispel pink color if necessary.

[5] A crystalline precipitate is assured by this procedure.

[6] Reference, **"A Rapid Method for Determination of Silica in Portland Cement,"** by Edwin Maczkowske, June 1936, Research Paper 891, Volume 16, Bureau of Standards Journal of Research.

Sales Promotion

(Continued from page 77)

sal roll crusher replaced the second Day pulverizer, which has been moved next to the first Day pulverizer, each receiving a split feed from the primary crusher. The primary jaw crusher has been replaced by a larger 30- x 42-in. Universal jaw, with the original kept in reserve. Thus, the larger amount of stone sent from the larger primary is handled by two secondary pulverizers in parallel, which assists in handling the increased amount of stone fed to the plant. The 3- x 8-ft. screen has been replaced by a 4- x 10-ft. screen to handle the greater feed. In addition, dust collectors will be installed on the pulverizers, which will reclaim an estimated 8 tons per day. New power units will also be added. The quarry will also feel the effect of new equipment, with a new ¾-cu. yd. Buckeye shovel to assist the present one. A new garage will be built to service and maintain all trucks and other equipment. Plans include the expenditure of about $60,000 for new equipment.

Mrs. W. W. McCall is president of the Richland Lime Co., and is co-owner with her son, Jack McCall. Jack McCall is a returned veteran, having spent eight months in the Seabees.

Pumice-Plaster

INSULATING AGGREGATES Co., Inyo Mono, Calif., has started production in a new pumice lightweight aggregate plant with initial production of 70 tons an hour. The property is located on 900 acres formerly operated by the California Quarries Co., in Mono County. L. B. Eaton, experienced pumice and plaster producer, is in charge. F. L. Murphree of Bishop, Calif., is mill superintendent. The pumice is excavated at comparatively small cost with the aid of bulldozers. After passing through a dryer in the plant and then through a series of crushers and screens, a chemical is added in a mixing bin to give the foaming characteristic to the aggregate. When this aggregate is mixed with gypsum plaster it is said to be 3½ times stronger than that required by Forest Products Laboratories tests. It also is claimed that the material is eleven times better non-conductor of heat than the same thickness of plaster made with sand as an aggregate. The entire operation is owned by G. M. M. Grant of Los Angeles, Calif., well-known manufacturer of piston rings, motor bearings, etc.

Labor Relation Trends

(Continued from page 91)

pleted a survey of such contracts, and published sample contract clauses. For example, lunch periods of 20 minutes are paid for on each shift; another, where a department or operation is on a three 8-hour shift basis, workers are paid for a 15-minute lunch period; another, 12 minutes per day is agreed upon as a fair and reasonable time to be compensated for changing clothes before and after work, these allowances to be as follows: One day worked ½ hour; two days ½ hour; three days ¾ hour; four days ¾ hour; five days 1 hour; six days 1½ hours; seven days 1½ hours. This agreement was made retroactive to August, 1943. Employes in a particularly dusty (toxic) occupation are allowed 20 minutes wash-up time before quitting; 10 minutes are allowed for wash-up by other employes in the same plant. Another contract allows only 5 minutes per day for washing up before leaving the job. Most of the other contracts provide pay for waiting and breakdown time, call-in pay, etc., which it has been common practice to pay for, regardless of recent portal-to-portal pay disputes.

Contract provisions have also been agreed to covering time spent in preparation and care of equipment. Others provide that time collecting their pay checks is on the company; time spent taking required physical examinations, or reporting to doctors at the company's request; or attending court as a witness to a plant accident. However, these probably have been common practices and present little that is new. The point is that all these are concessions by employers which should be remembered when combatting demands made by unions in collective bargaining contracts.

Summarizing, while the rights of employers are being slowly restored by a changing attitude on the part of administrators of these labor laws, the very fact that the administrators can change their minds and their decisions so radically as they have done since last Fall's election, seems to be further proof of the hazards of administrative law. Far from removing cause for changes in the laws, as the National Labor Relations Board is apparently attempting to prove, they would appear to be a prime reason for clarifying the laws so as to prevent constant changes in interpretations and enforcement.

Buys Quarry

GLENN BURKHART, Urich, Mo., recently purchased the Stewart-Nattinger quarry near Deepwater, Mo., from Frank Calvin, Clinton, Mo. Mr. Calvin purchased this quarry only a short time ago, but ill health led him to sell it to Mr. Burkhart who has been active in the quarry business for several years.

Arkansas' New Cement Plant Project

ARKANSAS INDUSTRIES, INC., Harrison, Ark., is the name of a new company with a capital of $5,000,000 which will manufacture portland cement and other stone products. About $2,000,000 in stock has been subscribed. Principal stockholders are: Richard H. Godfrey, Oklahoma City, Okla.; W. G. Bell, Springfield, Ohio; L. F. Rooney, Muskogee, Okla.; R. H. Seigfried, Tulsa, Okla; Virgil Douglass, Harrison; W. P. Watkins, Harrison; and J. Tom Grimmett. Plans for the construction of the plant hinge on the verdict of the I.C.C., concerning the abandonment of the Missouri & Arkansas Railroad. If the railroad is abandoned, the cement company will be dissolved.

Announce Bellefonte, Penn., Lime Plant

W. R. CLIFFE of Lime Industry Management and Engineering, Hershey, Penn., consulting engineers, has announced that a new lime plant will be erected in the Buffalo Run Valley directly west of the present National Gypsum Co. tract. The plant will start with two rotary kilns having an output capacity of 300 tons of pebble lime a day. During the first years of operation, stone will be recovered by surface mining methods but later on it is expected that underground operations will be employed.

Ready Mix Additions

TRANSIT-MIX CONCRETE CO., Anderson, Ind., has modernized its ready mixed concrete facilities with an expenditure of $25,000 for bulk cement handling equipment and four trucks. George F. and Gary Burke are partners in the firm which is a branch of the Burke Construction Co. Gary Burke is manager of the ready mixed concrete company.

Fire Damages Ready Mix Plant

BLUFFTON READY MIX CO., Bluffton, Ind., reported a fire recently damaged its plant with a loss estimated at $10,000. The company also makes concrete block. Roy Biberstine and Joe M. Michlitsch are owners.

Pipe Bids

LOCK JOINT PIPE CO., East Orange, N. J., was low bidder for 8600 lineal feat of 36-in. concrete pipe to be furnished to Toledo, Ohio. Low bid on lined steel pipe was submitted by Armco Drainage and Metal Products Co.

Fire Destroys Pipe Plant

KENTUCKY CONCRETE PIPE CO., Lexington, Ky., suffered a $75,000 fire which was partly covered by insurance, according to Charles Bell, superintendent. H. D. Palmore, Frankfort, Ky., is president of the company.

FINANCIAL

RECENT DIVIDENDS

Basic Refractories	$ .10	Mar. 15
Cleveland Quarries Co.	.25	Mar. 15
Glens Falls Portland Cement Co.	$ .50	Mar. 31
Ideal Cement Co.	.40	Mar. 31
Lone Star Cement Co	.87½	Mar. 29
Longhorn Portland Cement Co. Com. (pfd.)	.50	Mar. 31
National Gypsum Co. pfd.	1.12½	Mar. 1
Pennsylvania Glass Sand Corp. Com. (np)	.35	Apr. 1
Riverside Cement Co. pfd.	1.25	May 1
Standard Silica Co.	.10	May 15
U. S. Gypsum Co.	.50	Apr. 1
U. S. Gypsum Co. pfd.	1.75	Apr. 1

SUPERIOR PORTLAND CEMENT, INC., reported a net income of $215,258 for the year ended December 31, 1946, after charges and taxes, compared with a net income of $213,808 for the year ended December 31, 1945.

•

NEW ENGLAND LIME CO., Adams, Mass., had a net income of $94,334 for the year ended December 31, 1946, as against $38,345 in 1945. This rise in profits occurred in spite of labor and material shortages and the closing of the magnesium plant at Canaan, Conn.

•

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., had a net profit of $392,517 for the year ended December 31, 1946, as compared with a net income of $76,592 for the year ended December 31, 1945. Additions to plants and property accounts totaled $701,124 for 1946 as against $355,168 in 1945.

•

NATIONAL GYPSUM CO., Buffalo, N. Y., reported sales up 42 per cent to a new all-time high, and a net profit of $4,023,952 for the year ended December 31, 1946, compared with $1,000,616 in 1945. Sales in 1946 were $38,056,822 as compared with $26,742,094 in 1945. President Baker pointed out that these increases in sales were possible in spite of price advances of less than 16 percent from the 1940 average and only 7 percent since the end of OPA controls. More than $8,000,000 was spent on new construction and plant improvements last year. Major projects were the Baltimore plant and a lime plant in Kimballton, Va., which will be ready for operation in June.

•

PACIFIC COAST CEMENT CO., Seattle, Wash., has voted through its stockholders to sell the company's plant at Seattle and Alaska quarry at Dall Island near Ketchikan for $1,100,000 to General Construction Co., Seattle, Wash.

•

WARNER CO., Philadelphia, Penn., reports that sales are running ahead of 1946, and that net earnings for the first half of 1947 will be ahead of the $452,284 for the like 1946 period. The Warner Co., has expanded its improvement plans to a program involving nearly $5,000,000 on which $1,500,000 has been spent to date. A 30 percent increase in capacity is planned for all its lime, limestone, crushed stone, sand and gravel, and ready mixed concrete operations.

•

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., reported a net income of $1,268,264 for the year ended December 31, 1946 as against $407,372 for the year ended December 31, 1945. Sales of the company and subsidiaries in 1946 totaled $10,339,475 as compared with $6,941,400 for 1945. President W. A. Wecker said that shipments of cement in 1946 would have reached a record if production could have been stepped up to meet demand. The coal strike, delays in getting machinery, and shortages of transportation halted production.

•

UNITED STATES GYPSUM CO., Chicago, Ill., showed a net income of $12,413,955 for the year ended December 31, 1946 as compared with $4,352,955 for the year ended December 31, 1945. Sales of $85,360,686 in 1946 were a record, and compared with a 1945 total of $65,786,336. Sewell Avery, chairman of the board, reported to the stockholders that at the end of 1947 the company will have increased production facilities to about double pre-war capacity. The company set aside a construction reserve of $17,000,000 last year, and expects to have three new gypsum plants, and two paper and felt plants.

ALPHA PORTLAND CEMENT CO., Easton, Penn., had a net income of $1,606,959 for the year ended December 31, 1946 which compares with $165,059 for the year ended December 31, 1945. Net sales in 1946 were $13,168,355 as against $6,539,811 in 1945. Stockholders voted on a contributory retirement plan for employes which would become effective April 1, 1947.

•

GYPSUM, LIME & ALABASTINE CANADA, LTD., Toronto, Canada, reported a net profit of $581,970 for the year ended November 30, 1946, comparing with $249,680 for the year ended November 30, 1945.

•

MONOLITH PORTLAND CEMENT CO., Los Angeles, Calif., showed a deficit of $206,390 for the year ended December 31, 1946, as against a profit of $1,435 for the year ended December 31, 1945.

•

OREGON PORTLAND CEMENT CO., Portland, Ore., had a net profit of $199,198 for the year ended December 31, 1946, as against a profit of $93,960 for the year ended December 31, 1945.

•

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., showed a profit for the twelve months ended February 28, 1947, of $452,438. Sales revenue for this period was $7,861,691.

•

BESSEMER LIMESTONE & CEMENT Co., Youngstown, Ohio, had a net income of $782,514 for the year ended December 31, 1946. This compares with a net income of $207,055 for the year ended December 31, 1945. Net sales for 1946 were $3,627,771 as against $2,385,330 in 1945.

•

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., showed a net income of $3,025,912 for the year ended December 31, 1946, as against $779,742 in 1945. Net sales in 1946 were $25,830,653 as compared with $14,652,302 in 1945. Stockholders recently voted to reduce authorized $25 par common stock from 1,499,304 to 1,455,602½ shares, through retirement of 43,701½ shares, held in the treasury, reacquired at a cost of $779,897.

•

BASIC REFRACTORIES, INC., Cleveland, Ohio, had a net profit of $184,455 for the year ended December 31, 1946, as against $106,156 in 1945. The SEC report for 1945 shows sales of $5,127,854, but figures for 1946 are not available.

•

PEERLESS CEMENT CO., Detroit, Mich., reported a net income of $556,016 for the year ended December 31, 1946, as compared with $424,488 in 1945. Net sales in 1946 were $4,006,277 as against $2,589,120 in 1945.

•

LAWRENCE PORTLAND CEMENT CO., New York, N. Y., showed a net profit of $94,582 for the year ended December 31, 1946, as against a deficit of $134,950 in 1945. Net sales in 1946

were $3,785,447 as compared with $2,084,647 in 1945.

•

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, showed a net profit of $729,030 for the year ended December 31, 1946, which compares with a net of $94,140 in 1945. Net sales in 1946 were $10,153,246 as against $6,096,807 in 1945.

•

LONE STAR CEMENT CORPORATION, New York, N. Y., announced a net income of $5,293,214 for the year ended December 31, 1946, as compared with a net of $2,774,138 in 1945. Sales in 1946 were $39,848,152 as against $31,092,952 in 1945.

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GENERAL PORTLAND CEMENT CO., a consolidation of Florida, Trinity, and Signal Mountain Portland Cement Companies, showed a net income of $1,956,925 for the year ended December 31, 1946. Net sales for this period were $15,510,102.

•

KELLEY ISLAND LIME & TRANSPORTATION CO., Cleveland, Ohio, had a net profit of $411,733 for the year ended December 31, 1946. This compares with a net of $1224 in 1945. Sales in 1946 were $6,047,515 as against $4,944,520 in 1945.

Ready Mixed Concrete Plant Wins Zoning Case

STANDARD MIX CONCRETE CO., INC., which has been building a ready mixed concrete batching plant in South Bend, Ind., won its case before the city board of zoning appeals by a unanimous decision. Work had been halted on the plant since March 21, pending disposition of the case. The decision follows: 1. That the building permit was not issued in violation of the zoning ordinance; 2. That there was insufficient evidence presented to indicate that the ready mix plant is of a nature to be included in the list of exceptions barring certain kinds of plants from a light industrial area, such as is the site in question.

Vacuum Concrete Rights

WAILES-BAGEMAN, INC., Los Angeles, Calif., one of the largest concrete masonry manufacturing companies on the Pacific Coast, has secured the rights for Southern California to the vacuum concrete process. The process will be used in the manufacture of precast panels, roofing slabs, etc. Wailes-Bageman recently secured the contract for roofing slabs for the Standard Sanitary Radiator Co. to be built in the Los Angeles area. The roof will have an area of 10 acres.

Open Second Quarry

L. W. HAYES CONSTRUCTION CO., Kansas City, Mo., will soon open its second quarry in the Bethany Falls area on the Hefner farm. About $50,000 in new equipment will be installed. Diesel power equipment will be used. K. D. Kinnison will be manager of the new plant.

Manufacturers' News

Cummins Engine Co., Inc., Columbus, Ind., has announced the appointment of Walter N. Westland as manager of the Eastern region, and of George W. Stevens as manager of the Mid-Continent region.

John A. Roebling's Sons Co., Trenton, N. J., has announced the appointment of J. F. Berger to the position of assistant sales manager, Woven Wire Fabrics Division. Mr. Berger has been with the company for 37 years and has had long experience as a salesman and field engineer for the Woven Wire Fabrics Division. He is well known by mining and quarrying men all over the country. Mr. Berger's appointment is coincident with a program of expansion in both machinery and products for this division which is part of the company's $6,000,000 investment in modernization and enlargement of production facilities.

F. J. Berger

International Harvester Co., Chicago, Ill., has announced the following appointments: B. M. Kaiser as Southwest District manager of motor trucks; J. T. Sullivan as Eastern District manager; W. E. Callahan as assistant branch manager at Chicago, with L. A. Weinmann continuing as assistant manager; A. L. Metz as assistant branch manager at Kankakee, Ill.; D. H. Gummerson and V. I. Pearson as assistant managers at the Boston motor truck branch; Ray Cross as assistant manager at the Albany truck branch; W. G. Schendel as branch manager at Buffalo, succeeding M. A. Stanton, who has retired; G. D. Partridge as branch manager at Baltimore motor truck branch, replacing B. M. Kaiser, who was appointed Southwest District manager; and J. W. Young as assistant manager at Cleveland.

Rollway Bearing Co., Inc., Syracuse, N. Y., announces the opening of a new sales office in the Renshaw Bldg., Pittsburgh, Penn., with John B. Bell, formerly sales representative at Syracuse, in charge. Also the removal of the Chicago office of its representative, F. S. Darke and W. C. Schloskey, to 20 N. Wacker Drive.

Mack Trucks, Inc., New York, N. Y., announces the appointment of Henry Rewold as assistant general sales manager of Mack-International Motor Truck Corp. Mr. Rowold, also a vice-president of the company combines his new duties with those of national accounts manager, a position he has held for some time. Also the appointment of A. L. Monck, formerly of the St. Louis branch, as district manager at Des Moines, Iowa, to succeed John

A. Sloan, who has been transferred to the Chicago branch as district manager.

Bailey Meter Co., Cleveland, Ohio, has announced the election of H. M. Hammond, former general sales manager, and P. S. Dickey, former chief engineer, as vice-presidents.

Taylor-Wharton Iron & Steel Co., Easton, Penn., has appointed Dr. C. E. MacQuigg, Dean of Engineering at the Ohio State University, as a member of the consulting staff.

Gardner-Denver Co., Quincy, Ill., announces that Edgar F. Schaefer, executive vice-president, has been elected president of the company, and H. G. Myers, former president, has been named chairman of the executive board. In assuming chairmanship of the executive committee, Mr. Myers takes the post formerly held by the late J. W. Gardner. Mr. Myers joined the company in 1927 as chief engineer. Two years later he was made executive vice-president and in 1935 was elected president, succeeding W. H. Leonard, who became chairman of the board of directors, a post he still holds. Mr. Schaefer became associated with the company in 1919. He was elected vice-president in 1926, and became executive vice-president in 1942.

Edgar F. Schaefer

Independent Pneumatic Tool Co., Chicago, Ill., announces the opening of a technical office at Sao Paulo, Brazil, with Reuben P. Rudy as manager. Mr. Rudy has been representing the company in Brazil for the past two years.

The Hays Corp., Michigan City, Ind., has appointed Shirl M. Rudolph as vice-president in charge of sales, and William H. Pugsley as vice-president in charge of field research.

Johns-Manville Corp., New York, N. Y., has purchased the factories and other properties of the Goetze Gasket & Packing Co., Inc., New Brunswick, N. J., manufacturers of metallic gaskets.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that A. D. Robertson, formerly assistant manager of sales and engineering of the electrical section at Norwood, Ohio, has been named manager of the Tampa, Fla., district office, succeeding the late Berrien Moore. Arthur D. Brown, formerly manager of the Los Angeles district office, has been made manager of the Washington, D. C., office, and R. N. Landreth, who has been acting manager at Washington, will now devote full time to his special duties as assistant to W. C. Johnson, vice-president of the general machinery division.

Pioneer Engineering Works, Inc., Minneapolis, Minn., announces the ap-

pointment of two new distributors in Montana—Central Machinery Co., Great Falls, serving the northwestern part of the state, and Wortham Machinery Co., Billings, the southwestern area.

Robins Conveyors, Inc., Buffalo, N. Y., announces that Harold Von Thaden, vice-president, has gone to England and Europe on business that will occupy some fourteen months.

Chase Bag Co., Chicago, Ill., as part of its one hundredth anniversary celebration, has announced the completion of the new St. Louis factory at 5033 Southwest Avenue.

R. G. LeTourneau, Inc., Peoria, Ill., has announced the appointment of Robert C. Lewis as installation manager; Keith Thompson as applications engineer; O. S. (Jack) Williams as Western sales manager, with headquarters in Stockton, Calif.; and E. M. Ferguson as Eastern sales manager, with offices in Washington, D. C. The Central sales office has been moved from Peoria, Ill., to Kansas City, Mo., with W. B. (Bill) Worden as Central sales manager. C. D. Fey, formerly industrial sales representative for the western United States, is now serving in that capacity for the entire country, with headquarters at Peoria, Ill.

Davey Compressor Co., Kent, Ohio, has appointed Berry Bros. Machinery & Repair Works, Dallas, Texas, as distributor in northeastern Texas, adjoining Oklahoma, and the New Orleans Armature Works, New Orleans, La., as distributor for Louisiana and Mississippi.

Bemis Bro. Bag. Co., St. Louis, Mo., announces that George H. Parsons has been elected a director of the company, and A. H. Clarke has been named vice-president in charge of the newly formed general production department. Mr. Clarke is also a director of the company.

Bailey Meter Co., Cleveland, Ohio, has announced the election of H. M. Hammond, former general sales manager, and P. S. Dickey, former chief engineer, as vice-presidents of the company. Announcement has also been made of the appointment of the Portilla Corp., as agent in Puerto Rico, Republic of Haiti, Dominican Republic and the Virgin Islands. Sr. Angel Cobiella is president of the corporation which was formerly conducted by H. Clyde Gregory, Inc.

Prima Products, Inc., New York, N. Y., national distributors of Aquella, has appointed Joseph D. Zaiser to the newly created post of sales manager. This announcement was made by Milton Schreyer, president of the company.

International Paper Co., New York, N. Y., announces that the International Paper Products Division will open a branch sales office in Syracuse, N. Y. W. A. Scholl will be district sales manager and the office will be located at 269 Erie Blvd., West.

Barber-Greene Co., Aurora, Ill., has appointed the State Equipment Co.,

Harrisburg and Wilkes-Barre, Penn., as distributor in southern Pennsylvania, and the Townsco Equipment Co., Oklahoma City, Okla., as distributor in the State of Oklahoma.

St. Regis Sales Corp., announces the removal of the district headquarters office in Allentown, Penn., to 842 Hamilton Street.

Bath Iron Works Corp., which recently purchased the Pennsylvania Crusher Co., announces that the sales and engineering offices will be continued at Broad and Arch Streets, Philadelphia, Penn., as heretofore.

Chase Bag Co., Chicago, Ill., has appointed J. P. Falconer as assistant manager of the Dallas branch. A. C. Ogden is manager. Mr. Falconer has been with the company since 1931, first as office manager, Milwaukee, Wis., and for the past ten years as office manager of the Chicago general sales office.

Falk Corp., Milwaukee, Wis., has appointed Ken O. Hood as Pacific Coast district manager, with headquarters in Los Angeles, Calif.

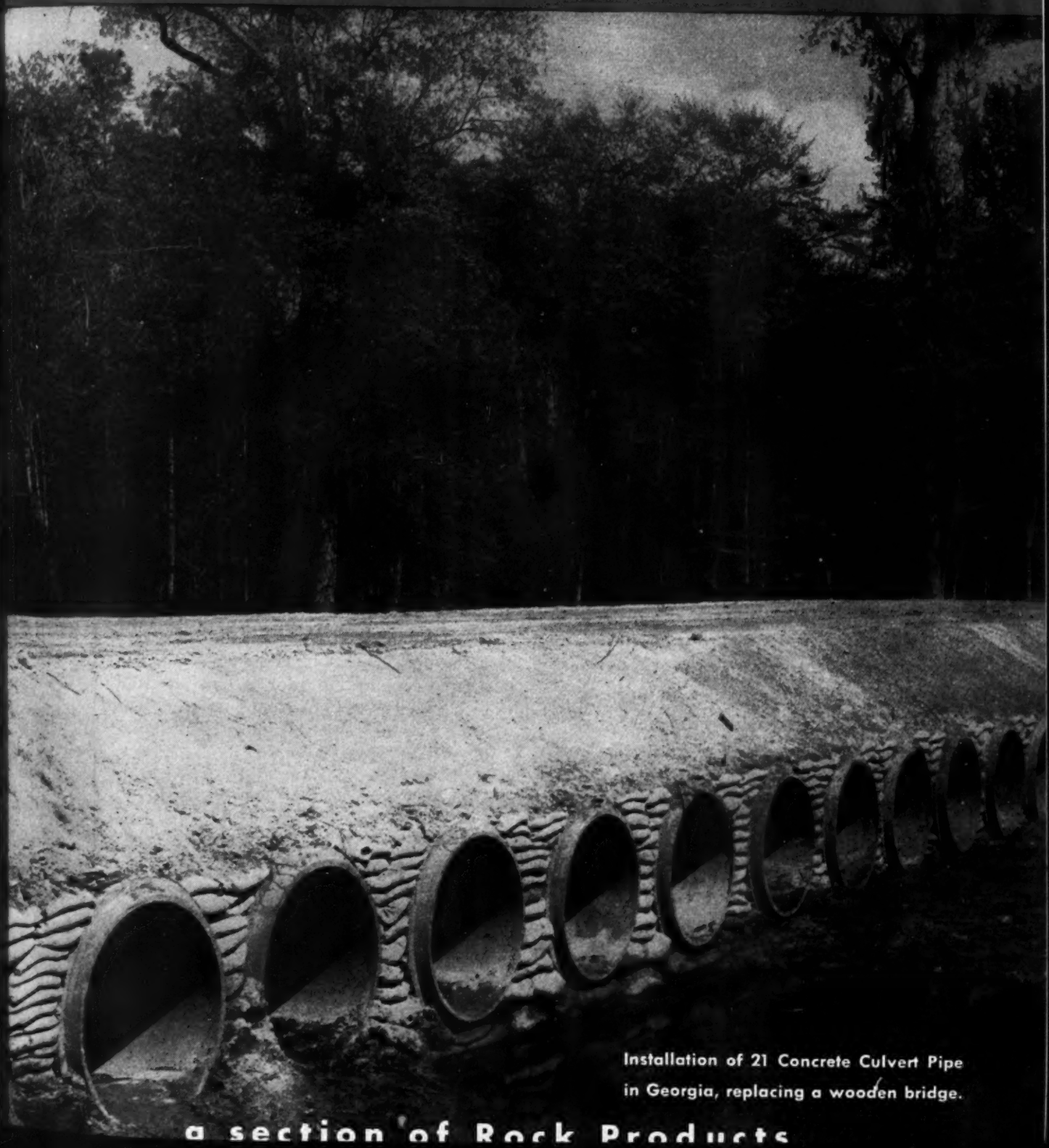
Northwest Engineering Co., Chicago, Ill., announces the removal of the executive and sales offices to the Field Building, 135 S. LaSalle Street.

John A. Roebling's Sons Co., Trenton, N. J., has appointed A. R. Robinson as manager of the Seattle branch.

International Harvester Co., Chicago, Ill., has appointed W. F. Schaeffer assistant manager at Shreveport, La., where he was formerly retail motor truck manager. M. R. McClure has been promoted from sales promotion man at Fort Dodge, Iowa, to assistant manager. H. T. Rosell, formerly retail motor truck manager at Wichita, Kans., has been appointed assistant manager at the Dallas motor truck branch. R. G. Walls has been made assistant manager at New Orleans. He was formerly retail motor truck manager at Atlanta, Ga. G. B. Healey, formerly retail manager at Eau Claire, Wis., has been appointed assistant manager at Davenport motor truck branch, and J. D. Richardson, formerly assistant manager at Omaha, Nebr., has been named manager of the newly established Omaha motor truck branch.

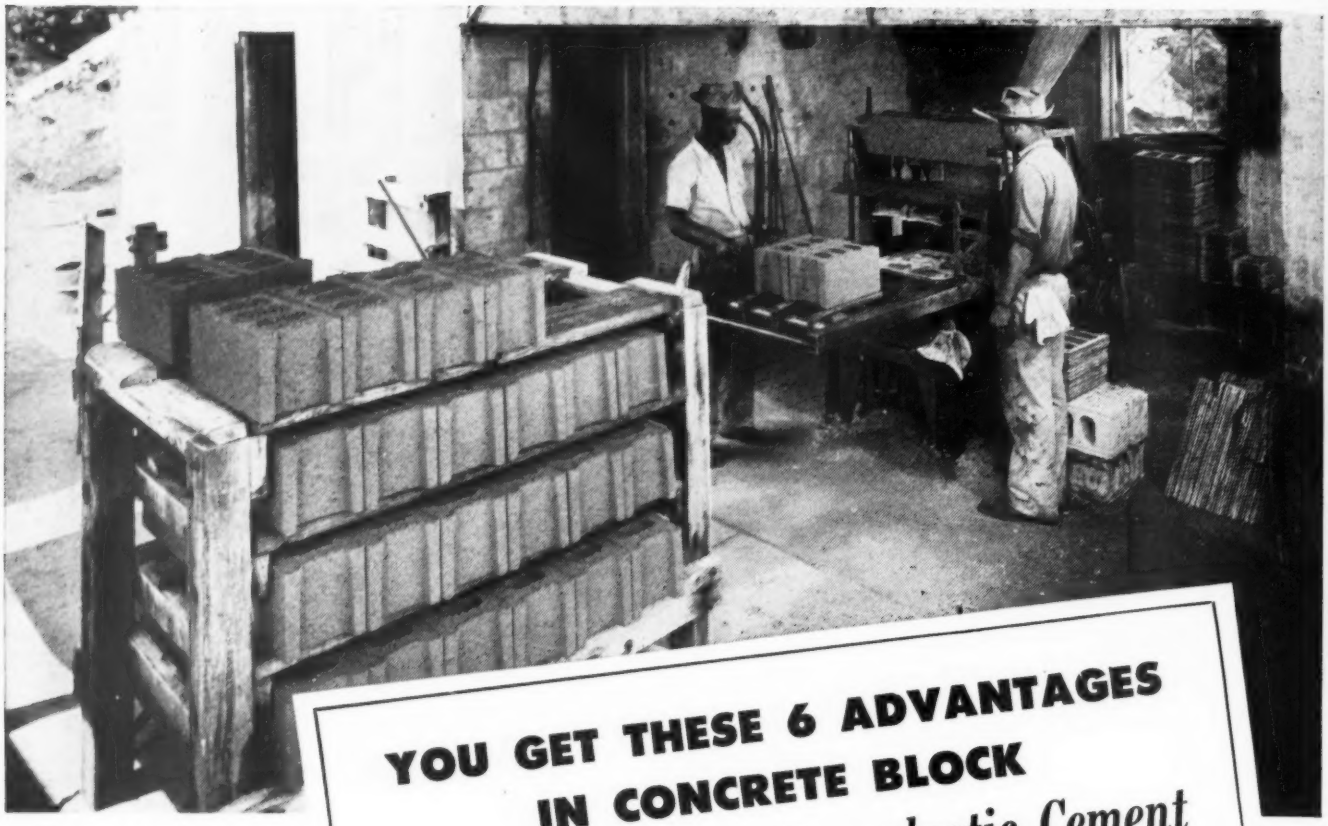
CONCRETE PRODUCTS

CONCRETE UNITS • READY-MIXED CONCRETE



Installation of 21 Concrete Culvert Pipe in Georgia, replacing a wooden bridge.

a section of Rock Products



Duraplastic block, Greenville (S.C.) Concrete Co.

YOU GET THESE 6 ADVANTAGES IN CONCRETE BLOCK made with Atlas Duraplastic Cement

Experience shows that Atlas Duraplastic air-entraining cement makes superior concrete block at no extra cost.

It permits the use of slightly more mixing water without causing slumping or distortion of the green product. Mix is more cohesive—holds together better—withstands rougher handling. Advantages of Duraplastic include:

1. **Generally improved appearance,** more exact edges and corners, truer dimensions, improved face texture.
2. **Denser,** more compact product.
3. **Generally increased** compressive strength.
4. **Less breakage** and less cracking in handling from machines to racks to kilns; fewer culls and throw-backs.
5. **Lower absorption of water** and greater resistance to passage of water.
6. **No added expense** or unusual changes in methods.

Atlas Duraplastic complies with ASTM and Federal specifications and sells at the same price as regular cement. Send for further information. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

OFFICES: Albany, Birmingham, Boston, Chicago, Cleveland, Dayton, Des Moines, Duluth, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.

CP-D-50

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

AIR-ENTRAINING PORTLAND CEMENT

MAKES SUPERIOR CONCRETE PRODUCTS AT NO EXTRA COST

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel—Sunday Evenings—ABC Network*

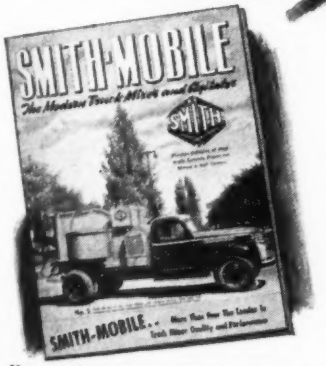
Here's NEW BEAUTY That Helps Me Sell Concrete!

"Yes, Sir . . . on every trip, the new 1947 Smith-Mobile's handsome appearance helps advertise my business . . . virtually acts as my concrete salesman."

Smith-Mobile's beauty is achieved largely by functional styling. Mixer engine, transmission, water pump, valve system and all moving parts are completely enclosed in a streamlined housing. And these improved Smith-Mobiles are easy to keep handsome . . . easy to "hose off" between trips. The roomy charging chute prevents spilling of dry aggregates or cement. And the perfected drum closing door seals batch in drum . . . keeps concrete from seeping out in transit.

Improved performance goes along with new beauty. Drums are larger, yet overall weight is materially decreased. Dual water injection system prevents freezing in cold weather. Direct-connected motor has 3-point suspension. Simple, lightweight transmission is foolproof. Drum rides on Timken Roller Bearings in rubber-cushioned case.

Four popular sizes. The demand for these improved Smith-Mobiles is still much greater than the supply. But deliveries are being stepped up by greatly increased production. Get the complete Smith-Mobile story — today!



New Bulletin Just Off the Press!
Gives you all the facts, dimensions and specifications of the improved SMITH-MOBILE models. If you haven't already received yours, be sure to ask for a copy.

THE T. L. SMITH COMPANY, 2885 N. 32nd Street, Milwaukee 10, Wisconsin, U. S. A.

SMITH MOBILE

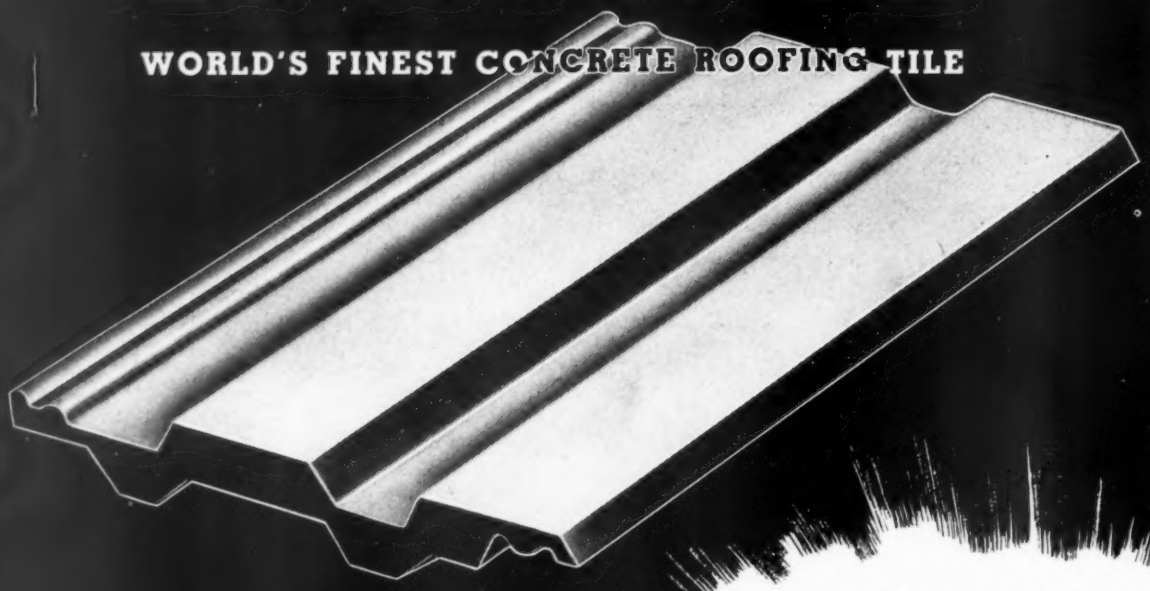
The Original High Discharge Truck Mixer and Agitator

A 5162-1P

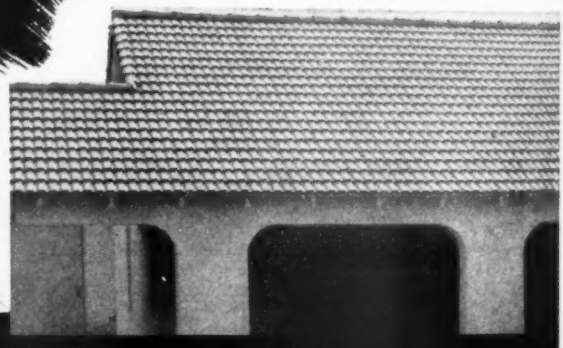
The New Roofing Sensation!

BARTILE

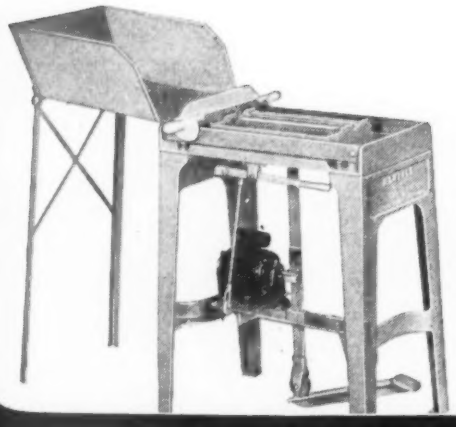
WORLD'S FINEST CONCRETE ROOFING TILE



- Distinctive, modern shape . . . light-weight . . . available in any color you desire.
- Outlasts the building it covers . . . and actually improves with age.
- Unaffected by heat, cold, rain or snow . . . fire-proof . . . cannot rust, rot or decay.
- Low initial cost . . . minimum upkeep . . . complete satisfaction assured.



Improve your position in the concrete industry . . .



Manufacture BARTILE

World's Finest Concrete Roofing Tile!

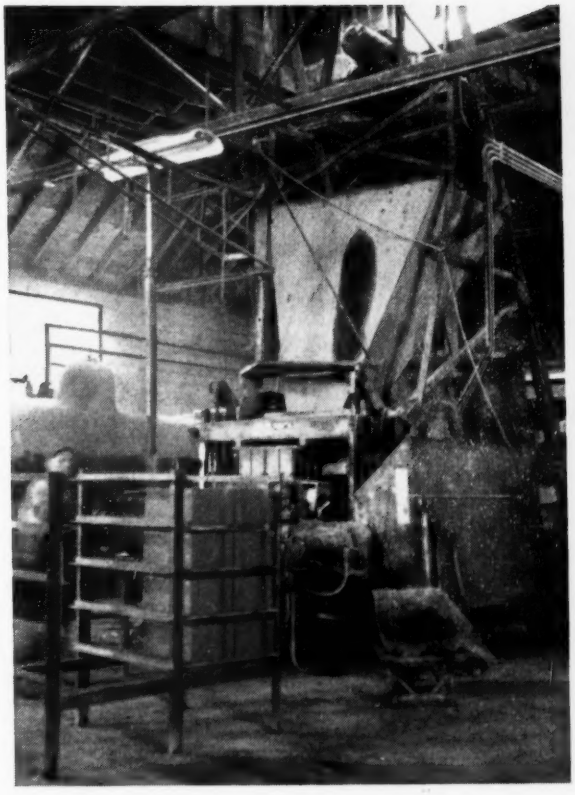
Bartile produces big profits. Easy to manufacture — one common laborer can make from 6 to 8 squares a day! Easy to apply — a laborer can lay 10 squares daily! Beautiful, permanent, interlocking Bartile adds distinction to the building it covers, increases property values. Its fire-proof qualities eliminate serious fire hazards, reduce insurance rates.

For the complete Bartile profit story, write to Dept. B-4 now!

E. P. BARBER COMPANY, P. O. BOX 3294, LOS ANGELES 53, CALIF.

Develops New Markets With Concrete Block and Ready Mix

Hedberg-Friedheim and Co., Minneapolis, Minn., large sand and gravel producer, has two concrete block plants and sells ready mixed concrete



One of the newest high-production block machines

READY MIXED CONCRETE operations will start in the Spring of 1947 and concrete masonry units are now being produced at the modern plant of Hedberg-Freidheim and Co., Minneapolis, Minn. The plant was constructed against the side of a hill in an abandoned pit that formerly was worked for sand and gravel. Three bins, placed in a straight line, are served from an overhead ramp by trucks that deliver aggregates from the near-by sand and gravel plant, also operated by this company. Specially designed trucks will deliver bulk cement. The first bin in the line is a four-compartment Butler bin for the storage of bulk cement. The second is an 8-compartment bin for the storage of aggregates for concrete production, and the third, a two compartment Butler bin, serves the block plant.

Aggregates are discharged into the two bins through a grizzley that forms the ramp. Although the aggregate bins are completely enclosed except at the top and thereby benefit from the heat within the plant, they are equipped with coils through which steam is passed to thoroughly heat the aggregates for production during freezing weather.

Under the aggregate bin in the block plant, a two-compartment, 1-cu. yd. volumetric batcher is used to measure the sand and gravel before introduction to a 54-cu. ft. Besser mixer. Cement, received from two compartments of the bulk cement bin through screw conveyor, is weighed by scales with an electrically controlled shutoff. Water, which is measured by a Besser meter, is received from a deep well pump and pumped to a 100-gal. tank by a Deming centrifugal pump.

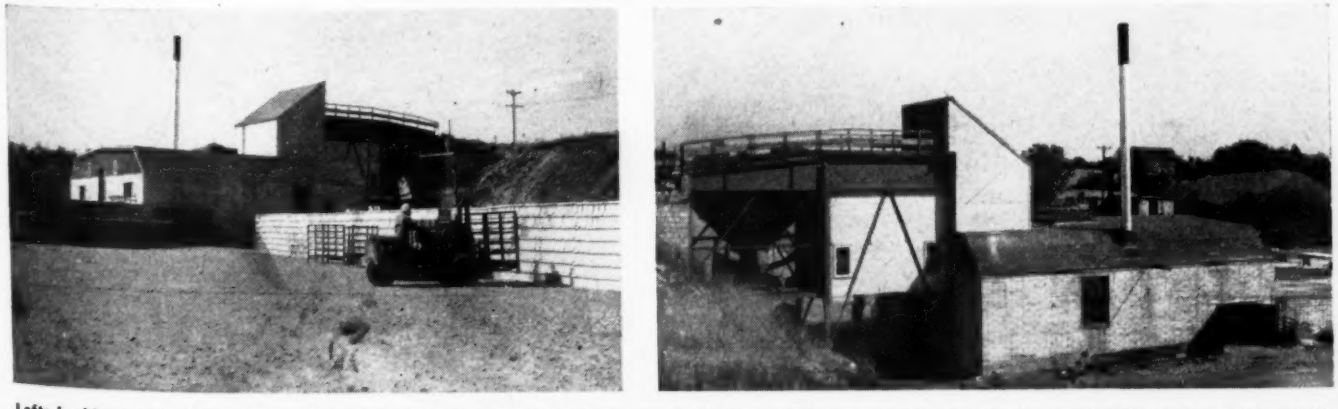
After mixing, the batch is delivered to a Besser Super Vibrapac by skip hoist. Finished block, placed on steel racks, are removed to steam curing rooms by two Erickson fork type lift trucks. The six rooms are 65-ft. long, 8-ft. wide, and 8-ft. high, and are equipped with a ¾-in. pipe with perforations spaced at 12-in. centers.

To more thoroughly seal in the steam, doors of the rooms are rubber lined for better curing. Blocks cured over night are moved to outside storage by the lift trucks. About one million units can be accommodated on the spacious area provided for storage.

Ready Mixed Concrete Facilities

Between the bulk cement bin and the main building, a housing covers the bin that stores aggregates for the ready mixed concrete operations. Under this bin is a weigh batcher and a scale for measurement of bulk cement. Two of the compartments in the bulk cement bin are reserved for the concrete plant. This scale also has an automatic shutoff, electrically controlled. Discharge from the batcher is through a sleeve, by gravity, to transit mixers. Water is stored in a 100-gal. tank, equipped with heating coils. Heat is provided by a 100-hp.

(Continued on page 145)



Left: Looking at plant from large storage area. Right: Ramp has been constructed over bulk cement bin, the bin for aggregates for the ready mixed concrete plant, and the aggregates bin for the block plant. To the extreme right are the curing rooms

Large Bulk Cement Capacity Cuts Plant Costs

C. W. Shirey, Waterloo, Iowa, has efficient system of screw conveyors and bucket elevator to move cement from cars into batching plant bins

C. W. Shirey, owner and manager, left, and A. J. Hurst, assistant manager

IN 1937, C. W. Shirey started producing ready mixed concrete in Waterloo, Iowa, with an old paving mixer and dump trucks. In 1938, he installed wooden bins and bought a couple of transit mixers. Since that time, the business has grown steadily, and at present, the plant is modern in every respect, with a fleet of 13 transit mixers and a bulk cement and aggregate bin capacity capable of handling a year around production of 75 cu. yds. per day.

Although a six compartment Blaw-Knox aggregate bin was installed in 1940, it was not until Oct., 1945, that a Butler Bin bulk cement arrangement was put into operation. In addition to the saving effected in labor and man power, Mr. Shirey says that the bulk cement system has saved him innumerable headaches that were caused by the handling of cement in bags. This bulk cement bin is a three-compartment affair, with a capacity of 1200 bbls. per compartment. Normal portland cement is stored in one compartment, high early strength cement in the second, and air entraining cement in the third. Two screw conveyors carry cement from the railroad siding to the bucket elevator that feeds the bin. The first conveyor is at a 9-ft. higher level than the second, due to the higher elevation of the siding. Cement carried by the first conveyor discharges to a gravity chute feeding the second, located at ground level. This second conveyor then carries the cement to the bucket elevator.

The cement bin is located adjacent to the aggregate bin, and cement and water are introduced to the transit mixers before the aggregates. Mr. Shirey feels that a better mixture can be made by this method, with less caking in the mixer and therefore, easier cleaning of the mixer drums at the end of a day's operations. After the mixer receives the cement and water, it moves to the aggregate bin where sand and gravel are added to the slurry in the drum.

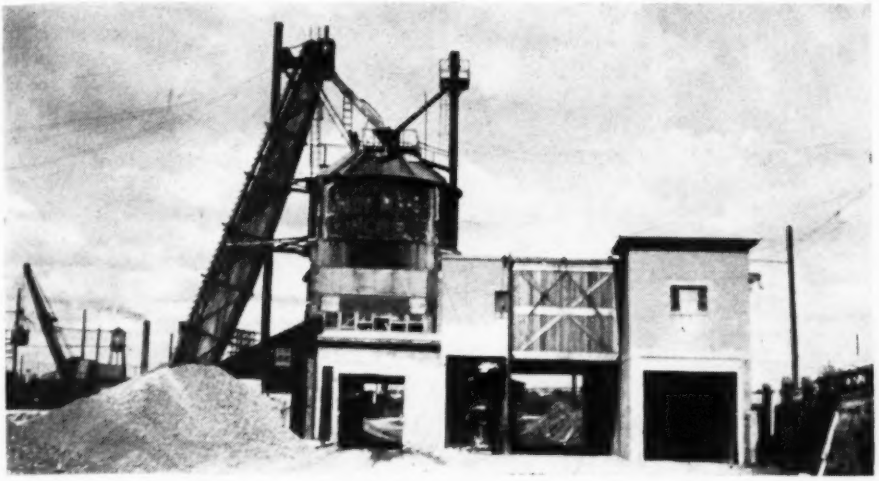
Aggregates are received from a company-owned pit nearby, as well as from local pits. Both truck and rail shipments can be handled at the plant. Trucks dump into a 6-ton capacity hopper at ground level while railroad cars are unloaded by a crane and stockpiled or placed in the hopper. Feed from the hopper is to the boot of an Iowa Manufacturing Co. bucket elevator, moving aggregates to the top of the bin, where a swivel chute, controlled by a wheel on the operator's floor in the plant, guides the aggregate into the proper compartment. Buckets on the elevator are on an 8-ply, 18-in. rubber belt, 67-ft. centers. Total capacity of the six compartments is 300 ton.

Feed from the bin is to a Blaw-Knox weigh-batcher, equipped with a 4-beam scale. At the rear of the batcher is a chute for the reception of bagged cement, which Mr. Shirey hopes that he will not have to use again.

Water is received from the city supply, and is measured in a 150-gal. tank equipped with Blaw-Knox scales. The discharge pipe from the tank carries water from the operator's floor to the point under the cement bins, where cement and water are added together.

Aggregates and water are heated during the cold season. For this purpose, a Pacific horizontal boiler sends steam at 15 p.s.i. through pipes into the aggegate bins. The boiler also heats water in a Howard Iron Works 1000-gal. tank controlled by a Powers Regulator Co. thermostat. The boiler

Line-up of modern transit mixer equipment alongside garage shop

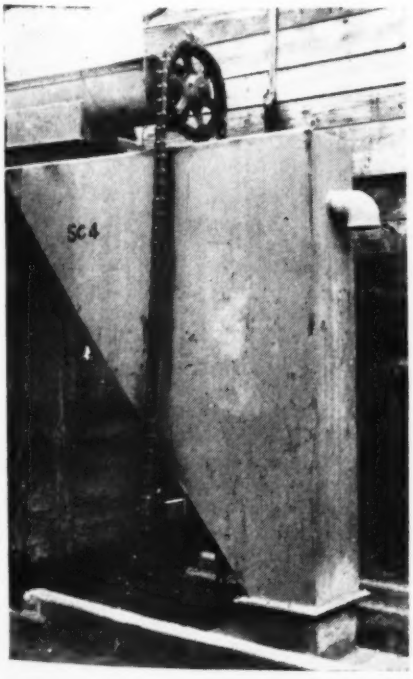


Overall view of batching plant with 300-ton, 6-compartment aggregates bin, to the left, and bulk cement bin immediately back of it

is equipped with a McDonnell and Miller automatic water control.

The fleet of 13 transit mixers is composed of seven Blaw-Knox high dump 1½-cu. yd. mixers; five Rex 2-cu. yd. mixers; and one Jaeger 2-cu. yd. mixer. All mixers are mounted on Ford trucks. Since some are high dump and some are low dump, a specially-designed funnel has been made so that the low dump mixers can receive aggregates without spillage. This funnel is placed on the top of the low dump mixer and aggregates are sent through it to the drum.

The demand for ready mixed concrete in the Waterloo area is such that steady production the year around is maintained to meet this demand. Very few hauls of more than 20 miles are made.



Showing how one screw conveyor at higher level feeds the one below

Replace Wooden Bridges With Concrete Culvert

MORE than 100 wooden bridges were replaced by the Savannah Division of the State Highway Department of Georgia in 1944 with multiple lines of reinforced concrete pipe. In Effingham County, 17 wooden trestle bridges were replaced in 1945 and 1946 with multiple lines of reinforced concrete pipe. In the illustration, which appears on the front cover of the Concrete Products section in this issue, is shown a 21-line structure, 19 lines of 48-in. reinforced concrete pipe are shown and two lines of the same diameter are submerged in the channel to provide dry weather flow. Complete details regarding this interesting use of concrete pipe may be found in a recent bulletin prepared by M. W. Loving, consulting engineer, Chicago, Ill.

Floating Concrete

JACK BREM and associates of San Diego, Calif., are planning to start a concrete products plant using expanded Perlite for an aggregate which is said to make possible a concrete that will float. A process has been invented for the manufacture of an expanded Perlite by a continuous process, probably by some type of rotary kiln. In addition to the San Diego concern, there are two other processors of Perlite: Continental Basic Materials Co., Chula Vista, Calif., and the Perlite Corporation of America.

Will Build Block Plant

DEAN TAINTER and ERNEST ROSS of Marion, N. C. are planning construction of a concrete block plant to be located in Marion. Production is anticipated for the early part of 1947.

L AND K CEMENT CO., Floodwood, Minn., owned and operated by Ed Luoma and Aldrick Kivela, has started producing concrete block at the rate of 1500 block per day.

Seattle Concrete Products Meeting Well-Attended

A GOOD ATTENDANCE greeted President Fred M. Kettenring at the Spring meeting of the Concrete Pipe and Products Association in Seattle, Wash. Mr. Kettenring, who also is a director of the National Concrete Masonry Association, presented a detailed account of the national convention in Chicago.

C. B. DRYSDALE pinch-hitted for Mr. Drew, district airport engineer, CAA, and outlined probable airport developments in the district. He also presented a breakdown of the funds available, the names of communities which are active in planning the development of airports, and the type of airport the CAA considers necessary for the community's need. Type of drainage for various classes of airports also was given.

R. W. CONDON of the Graystone Concrete Products Co., Seattle, filled in for Mr. Goldrick, Olympia, who was ill, in leading the discussion on the subject, "Dangerous Practices in Local Concrete Pipe Manufacturing." This discussion dealt mainly with the elimination of culls and poor products as well as stepping up production. Some of the Association members are trying out a plan of extra payment for high production on pipe machines and the discussion therefore centered about the determination of how much of a run was first grade pipe.

NORMAN FIELDS of Graystone started off the discussion on New Fields for Concrete Masonry. The possibilities of using a pumice floor tile was brought up as this lightweight aggregate makes it possible to meet the weight requirement without difficulty. The University of Washington is now engaged in a big building program, and the association was able to get in the specifications on partition tile with standard 4- x 8- x 16-in. stone block. This was the result of some sound penetration tests and the experience gained with concrete masonry in building a new Engineering building using 8- x 8- x 16-in. units for back-up.

Enlarge Ready-Mix Plant

SHEARS READY MIX CONCRETE CO., Hutchinson, Kans., has enlarged its batching plant facilities to increase capacity to 250 cu. yd. of concrete per day. There is a new bulk cement storage unit, under-track conveyor and bucket elevator which permit rapid handling of aggregates into storage.

Make Silo Staves

THE NORTHWEST CONCRETE PRODUCTS CORPORATION, Centralia, Wash., has leased a building in this city near Borst Park which will be used to manufacture concrete stave silos.

The DESIGN of Concrete Mixes

Part 5: Hidden Leaks in Concrete Manufacture

By R. E. ROBB*

IN PRECEDING ARTICLES the fundamentals of precise and scientific control of concrete manufacture were discussed. This article will show how these principles can be applied to the operation of a concrete plant to stop some of the hidden leaks which drain off profits.

Just as hidden taxes sap net income, so hidden leaks may easily make the difference between black and red ink. The manufacture of concrete is, perhaps more than many lines of business, subject to unknown, even unsuspected, leaks which drain off net profits. With precise control, and even with control which might not in all respects measure up to the term "Precise," many of these leaks can be stopped, if their existence is known. The three most dangerous and insidious of these hidden leaks are: "Too High Quality," "Too Much Small Aggregate," 'Too Much Concrete."

Too High Quality

This applies to all types of concrete manufacturing plants: ready mixed concrete, construction, and concrete products. The structural member or the products unit has been designed for the functions required of it, and in the specifications have been embodied the requirements as to quality: strength, impermeability, resistance to wear, etc. In structural design a factor of safety of from 4 to 6 is usually used. This means that in the case of a concrete beam, for example, the beam has been designed to be from four to six times as strong as it is ever expected will be necessary. If 600 p.s.i. compressive strength has been used in the design, 3000-lb. concrete may be specified. If 3000 p.s.i. crushing strength is all that the designer needs, then he should get 3000-lb. concrete *and no more* except that a small margin of safety should be used by the concrete manufacturer to insure that every batch does come up to the required standard. But in many cases standard tests show cylinders breaking at 4000, 4500, 5000 p.s.i., and even higher. This means that more cement, and therefore more profits, has gone into the concrete than was necessary—an absolute waste. Furthermore, due to the increased liability of the richer concrete to crack because of increased volume change, it may under some conditions prove to be a positive detriment.

The seriousness of this waste will be more apparent if a specific case is examined. Suppose, for example, that concrete as delivered tests an average of 500 pounds per square inch more than required, and that the concrete supplied must test at least 2500 lbs.; i.e., 3000-lb. instead of 2500-lb. concrete is furnished. Referring to Fig. 1, it is found that a cement/water ratio of 1.24 is required for 2500-lb. concrete, whereas the C/W ratio for 3000 lbs. is 1.47. Using the same example as was used in the preceding article, Part 4, entitled "The Arithmetic of Design for Quality and Economy" it will be found that instead of 347 lbs. being used ($280 \times 1.24 = 347$), it will be necessary to use $280 \times 1.47 = 412$ lbs. or a waste of 65 lbs. of cement per cubic yard. For every 1000 cu. yd. the waste would be 65,000 lbs. and with cement costing say 65¢ per bag, the increased cost would be $65 \times \$.65/94 \times 1000 = \$450$. The hidden leak, and hence the loss in net profits from this cause alone would amount to $45,000 per year in a plant making 100,000 cu. yd. annually. It should be noted that the above estimate of savings is conservative, as the increase in crushing strength was figured at only an average of 500 lbs. Additional variation would mean additional reduction in net profits, absolute waste.

Using the same basic figures, an average increase in crushing strength of only 100 p.s.i. above that specified would call for a C/W ratio of 1.27 or a cement factor of 356; a loss of 9 lbs. of cement per cubic yard. This would entail a direct loss in net profits of $6,220 per year for the 100,000 cu. yd. plant.

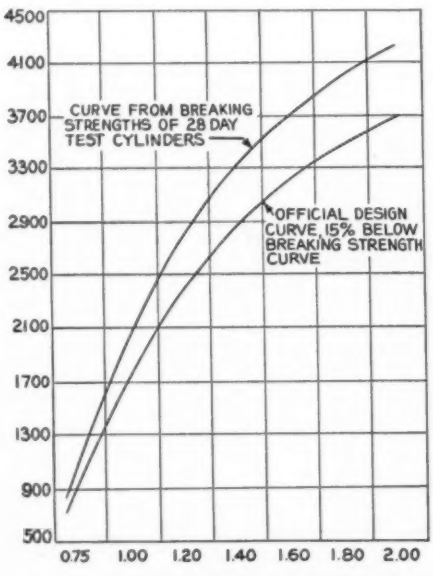


Fig. 1: Concrete design curves to determine cement-water ratios

From the above it is apparent that precise control of concrete manufacture is sound business.

The remedy lies in knowing the cement/water paste ratio which will give the required quality, and then holding to that ratio. The method of determining this factor was discussed in detail in the third article of this series. It consists, briefly, in preparing curing and testing specimens of known cement/water ratios under standard conditions, preparing a cement/water ratio-strength, cement/water ratio-impermeability, etc. chart, depending upon the quality which it is desired to secure, and then plotting the results. A curve through the average values gives the cement/water ratio to be used for any required quality of resulting concrete. The curve used in designing the mix should in general be from 10 per cent to 15 per cent below the test specimen curve to allow for unavoidable variations in manufacture. This safety percentage would depend upon the degree of precision with which the plant is operated. As control becomes more precise and effective, this percentage can be reduced. Tests of the concrete as made should be run regularly to insure that the required quality is actually being secured. If these steps are followed, very large savings can be made with actual improvement in the quality of the concrete.

Too Much Small Aggregate

The effect of using smaller sizes of aggregate where larger sizes could have been used and still secure required placeability under operating conditions was discussed in detail in preceding articles of this series. In these articles the law was developed that, "Using smaller sizes of aggregate when larger sizes could have been used, wastes cement," and hence decreases net profits.

Since the cement/water ratio must be kept constant for a given degree of quality, the objective in this case is to use as little of the required cement/water paste as possible under placement conditions. This means reducing the mixing water as far as possible, which results when larger instead of smaller aggregate is used. Under many conditions it is possible to very greatly reduce the water content, thereby effecting material cost reductions, and at the same time sup-

*Consulting Engineer.

plying better quality concrete. An example will indicate the savings possible.

Some years ago the writer was supervising the design and manufacture of concrete for the foundations of a large manufacturing building. The specifications called for 3000-lb. concrete to fill caissons from 5 ft. to 8 ft. in diameter which went down approximately 100 ft. to hardpan. Concrete was deposited by dropping through a tube 1 ft. in diameter. The engineer in charge specified concrete just wet enough to come out of the transit mixer, relying on the drop to thoroughly consolidate the concrete in the caisson. It was found that a cement/water ratio of 1.27 was required to give 3000 p.s.i. at 28 days. Accordingly the mix was designed, using 280 lbs. of water per cubic yard. This, however, was found to be too wet, and to contain more fines than were necessary. The water content was accordingly reduced and the proportion of coarse aggregate increased by gradual steps, at all times, however, holding rigidly to the C/W ratio of 1.27. It was finally found that it was possible, by heavy increase in the larger sizes of aggregate, to supply a satisfactory mix with only 240 lbs. of water. This, multiplied by 1.27 gave a cement factor of 305 lbs. per cu. yd. If 280 lbs. of water had been used, the cement factor would have been $280 \times 1.27 = 355$. Hence a saving of 50 lbs. of cement per cubic yard was made. This, however, is the saving between two mixes, both under precise control. Prior to the installation of this control this ready mixed concrete company would have used, and had for years been using, 520 lbs. per cu. yd. for all 3000-lb. concrete. Hence the real saving to the company was 215 lbs. per cu. yd. A series of test cylinders was made for each caisson poured. All tested up to or above the required 3000 p.s.i.

The remedy for this hidden leak lies in proper handling of aggregate to avoid segregation; proper development of optimum grading proportions; and close control of the total weight of all ingredients charged into the mixer, with special attention to total mixing water.

Too Much Concrete

The contractor and the concrete products plant cannot expect to secure savings in this respect because, in the first place, the forms have to be filled, and in the second place, the product is still the property of the producer. But conditions are very different in the case of the ready mixed concrete company where, as is the almost universal practice, concrete is sold by the cubic yard delivered. In this case, if more than a cubic yard is delivered, the ready mixed concrete company has simply made a present of so much concrete to the purchaser.

If concrete is designed on the absolute volume basis, as developed in the article appearing in the February issue of ROCK PRODUCTS, and the total absolute volume of the concrete is exactly 1 cu. yd., then the concrete as delivered will be slightly over 1 cu. yd. on account of the entrained air, and hence will be on the safe side as regards quantity. If a vibrator is used in placing, and all the entrained air is removed, the concrete in place will be exactly one cubic yard.

It has been the writer's experience that very many ready mixed concrete plants do not have properly designed mixes, and do not have sufficiently accurate control to hold accurately to exact quantities. In order to avoid argument with their customers they usually make their mixes to yield slightly, or so they think, more than 1 cu. yd. Also, if the mix has been improperly designed and it is necessary to add mixing water at the job, the volume of the mixing water added amounts to a present of concrete to the purchaser. This overage can amount to a very large loss of revenue, and hence reduction in net profits, if not corrected.

The writer was called upon to install precision control in the plant of an old but very progressive ready mixed concrete plant in New York City. The first step was to check the mixes then being used. These were on the basis of specified weights of all dry ingredients with sufficient water to secure satisfactory placement. The four mixes most commonly used on one large job were analyzed. The excess yields were found to be as follows: 2.96 per cent, 3.26 per cent, 3.56 per cent, 4.6 per cent, giving an average of 3.50 per cent excess yield in every batch going to that particular job. With concrete at $7.00 per cu. yd., the ready mixed concrete operator was giving away 24.5¢ worth of concrete with every cubic yard, or practically $1.00 with every 4-cu. yd. load. On this basis, a plant selling 100,000 cu. yds. annually would have its net profits reduced $24,500.

The remedy for this hidden leak is precise control. Specific gravities must be accurately determined, concrete must be accurately designed on an absolute volume basis, and total mixing water must be kept under accurate control.

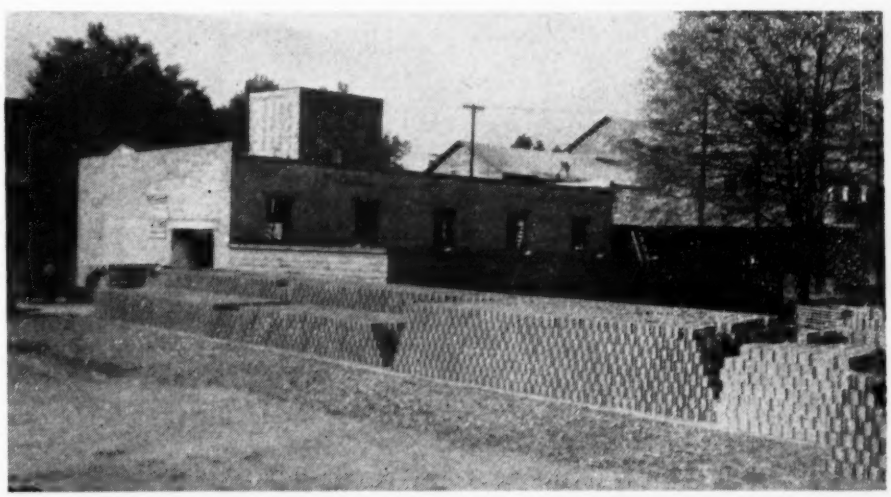
It should be noted that the three hidden leaks mentioned above may all occur and be cumulative in each batch of concrete manufactured. A higher cement/water ratio than necessary for specified quality may be used, improper grading may require more cement paste than necessary, and yield may be excessive. Not only is it possible that all three conditions can exist together, it has been found that very frequently they actually do.

The next article of this series will outline how precision control can be installed in any concrete manufacturing plant equipped with weighing apparatus for batching.

Enlarge Products Plant

GREYSTONE CONCRETE BLOCK CO., Henderson, N. C., producers of concrete masonry units, septic tanks, drain tile, and precast concrete sign posts since January, 1946, are now in the midst of an expansion program that will triple present production capacity. This company is also entering the ready mixed concrete field. Included in the new installations are a Besser Super Vibrapac to augment the production from the present machine; a Johnson Octobin that will serve both the block plant and the ready mixed concrete operations; two yard hoists for cubing; a bulk cement installation; an Erickson fork type lift truck; a Hough pay-loader; a Cleaver-Brooks steam generator; and three Jaeger transit mixers

J. V. Cannady, V. E. Hedrick, and A. D. Capehart are co-owners of the Greystone Concrete Block Co.



Neat, carefully stock-piled concrete block on paved yard facilitates circulation of air between units

Looking toward cinder crushing section of plant. Note portable conveyor which feeds hammermill

Preparing Cinders for Concrete Block

Cinder Block Co., Hampton, Va., uses both hammermill and roll crusher for processing cinder aggregates for block

STARTING OPERATIONS in July, 1945, the Cinder Block Company of Hampton, Inc., has had to almost double capacity to meet present day demands. While not a large plant, it is well-equipped for processing cinders, block production, and handling of units from machine to curing room and yard storage.

Cinders which are received on a track adjacent to the plant are moved from a stockpile by a portable conveyor to the hopper of an Eagle hammermill where the larger lumps are reduced. The product of the hammermill is conveyed by belt conveyor to a New Holland roll crusher for final crushing. On the belt conveyor that moves the cinders to the plant is a Dings magnetic separator to remove iron from the cinders. From the cinder crushing plant, the cinders are chuted to the boot of a bucket elevator which carries the cinders to a double-deck Telsmith screen for sizing before passing into compartments in a 110-ton Blaw-Knox bin. Cinders are chuted from this bin to a 50-cu. ft. Stearns mixer.

Operations were started with one No. 9 Stearns Joltcrete machine and a Stearns Stripper Clipper unit. Another No. 9 Joltcrete was obtained later and the Stripper was disposed of. With the two Joltcrete machines, 8000 8- x 8- x 16-in. masonry units can be manufactured per 8-hr. shift. For a long period this equipment had been operating on a two-shift basis until CPA in Washington cut out commercial building.

To facilitate handling the block by rack and lift truck, turntables are located within easy reach of the block machines. There are three lift trucks; two hand trucks and a Lewis-Shepard power lift fork truck.

Five steam curing rooms each hold 1200 of the 8- x 8- x 16-in. masonry units or equivalent smaller sizes. Steam is provided by a 30-hp. Lookout Scotch marine boiler fired by a 2 AR-141 Ray automatic fuel oil burner, using bunker C oil.

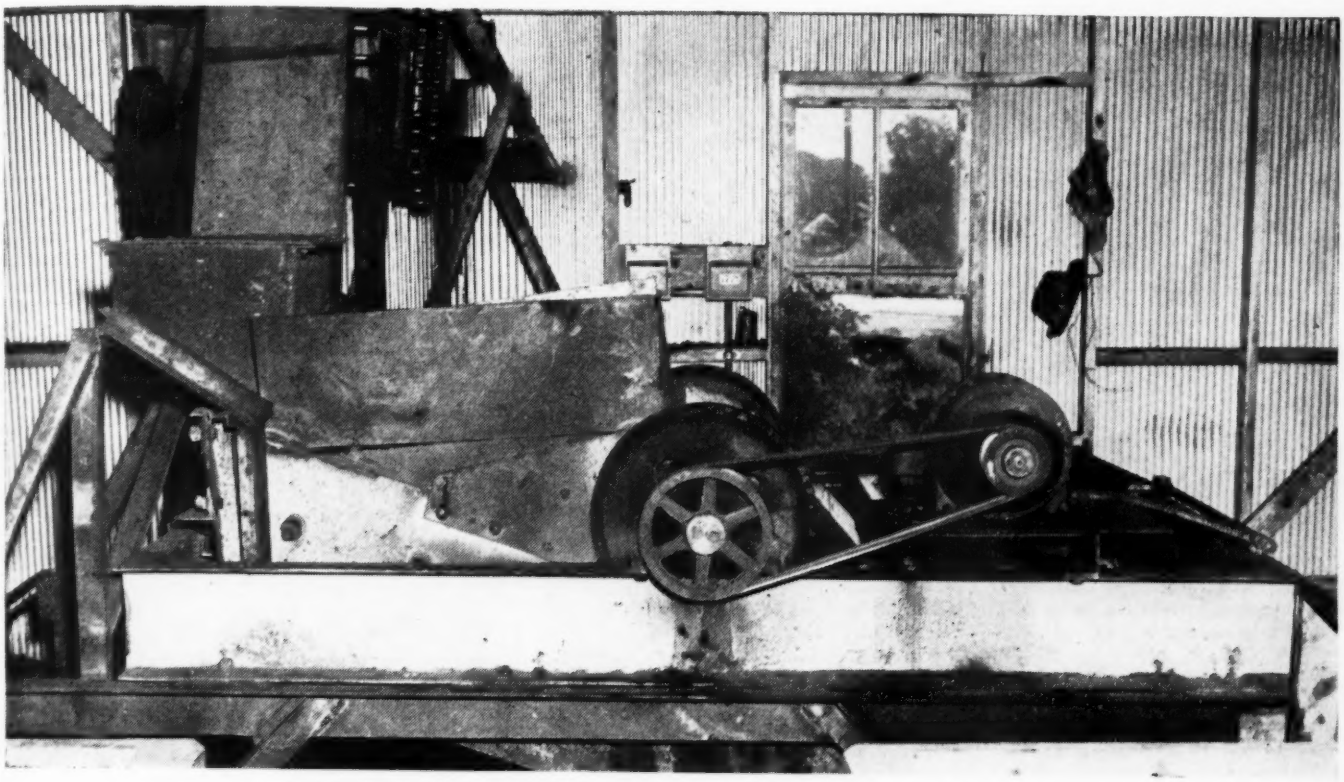
Ownership is in the hands of men who have had a wide experience in the production and marketing of building materials. Clyde Lamkin, president and general manager, was for a number of years with Lehigh Portland Cement Co. After leaving Lehigh, he went into the sand and gravel business, and left that business to manufacture concrete products. His other two associates in the business are H. G. Fowler, president of the Waterfront Lumber Co., Newport News, Va., and L. S. Ranhorne, head of a ready mixed concrete business in Hampton, Va. Mr. Ranhorne is vice-president of the concrete block company, and H. G. Fowler is secretary-treasurer.

Big Concrete Pipe Contract for Kansas City Water

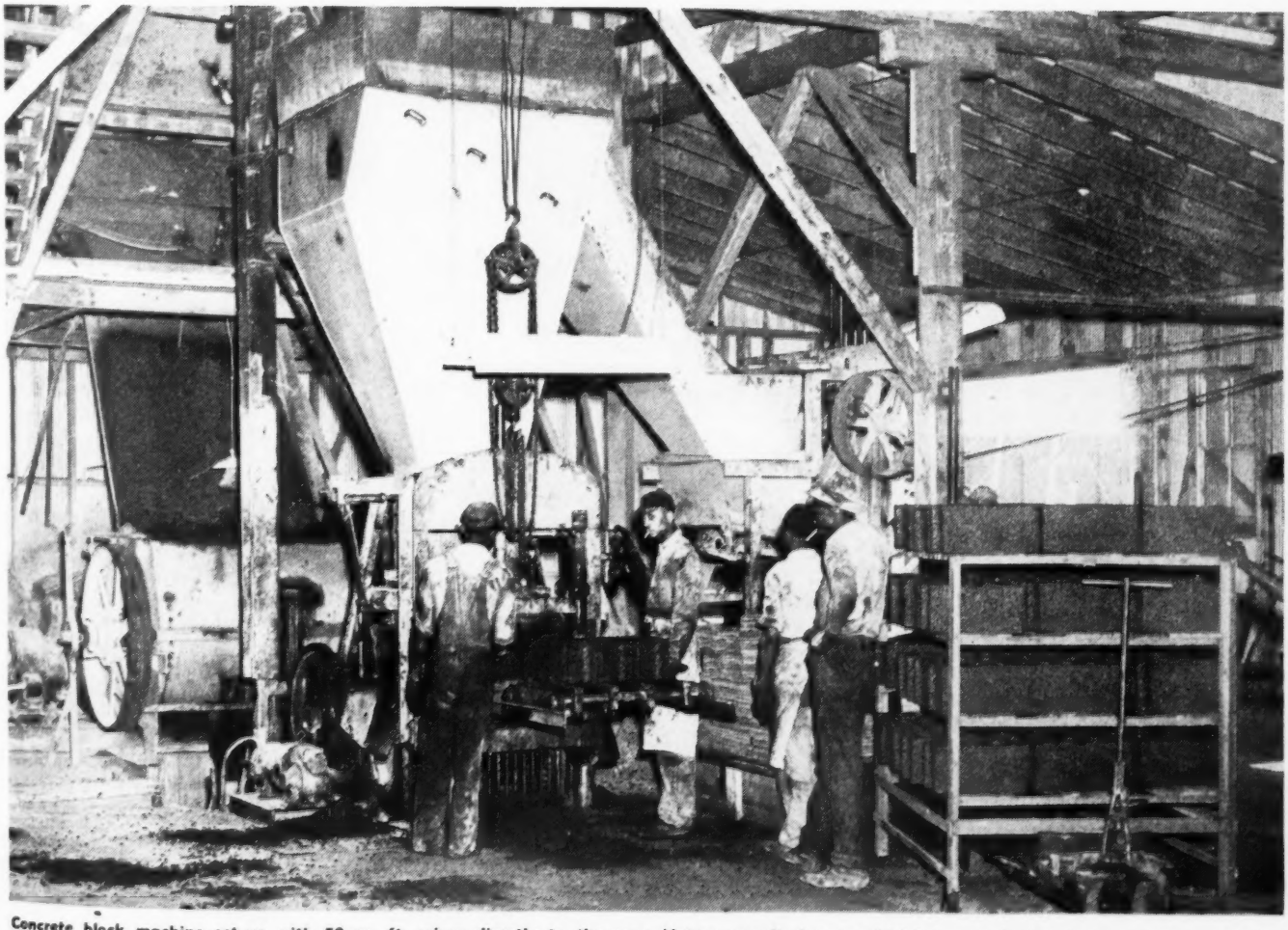
AN ORDINANCE was passed by the Kansas City, Mo., city council confirming a $709,770.50 contract for furnishing the city concrete pipe for a 7½ mile water main from the Turkey Creek pumping station to an underground reservoir. The Lock Joint Pipe Co. bid called for delivery of the pipe to start in 185 days and to be completed in 365 days.

Volcanic Ash Plant

QUAKER PRODUCTS COMPANY'S silica plant at Gate, Okla., will resume operations under the control of a Kansas City, Mo., concern, according to local reports. Volcanic ash is plentiful in this area, and this plant operated until several years ago when it ceased operations.



Roll crusher for final crushing of cinders which were first passed through hammermill



Concrete block machine set-up with 50-cu. ft. mixer directly to the rear. Note unusually large and high hopper feeding block machine which has gate to control flow of concrete into chute to feed smaller block machine, to the right

Lightweight Aggregate

Making Concrete That FLOATS

Continental Basic Materials Corporation, Chula Vista, Calif., producing a lightweight aggregate from obsidian

By LAURAN G. CLAPP

When mixed with the proper proportions of the new lightweight aggregate, cement and water, the slab of concrete floats in water

POSSESSING the remarkable qualities of being both light in weight and yet able to withstand great stress loads is a new lightweight aggregate being manufactured by the Continental Basic Materials Corporation, Chula Vista, Calif., under the trade name of Continental Basic Material or CBM as a trade mark.

It is claimed to be lighter than cork, waterproof, acid-resistant, fireproof, and possesses a thermal conductivity equal to the best insulating materials on the market today. When CBM is mixed with cement the result is a material several times lighter than sand and gravel concrete, yet possessing greater compressibility, and it is able to withstand stress overloads without cracking.

The aggregate is manufactured from an obsidian rock mined in Nevada which is easily broken into small particles, similar to pea gravel, for processing. Chemical analysis of the raw rock shows the following composition:

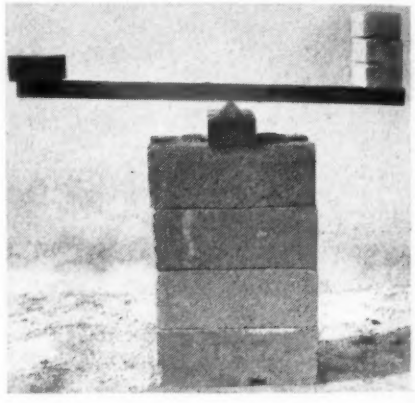
SiO_2	(Silica)	72.2%
Al_2O_3	(Aluminum Oxide)	12.49%
Fe_2O_3	(Iron Oxide)	3.19%
MgO	(Magnesium Oxide)	0.70%
Na_2O	(Sodium Oxide)	5.6%
CaO	(Calcium Oxide)	3.35%
Moisture		0.01%

It has been more or less common knowledge among geologists that by applying heat to types of volcanic glass rock, a light fluffy product could be obtained possessing remarkable lightness and insulation value. To process this obsidian commercially, however, has been a tough problem. For one thing, the product must be removed from the furnace while it is hot, before it fuses and becomes glass. At the same time, it must be allowed to remain long enough for the expansion process to become complete. Then, too, there is the problem of recovery. Because of the low specific gravity of the product, it is inclined to remain suspended in the air.

Officials of the present Continental Basic Materials Corporation spent many years studying the problems before their solution was found. The answer is in a patented furnace that pops the obsidian completely, and in a system whereby the final product is successfully carried away and retrieved.

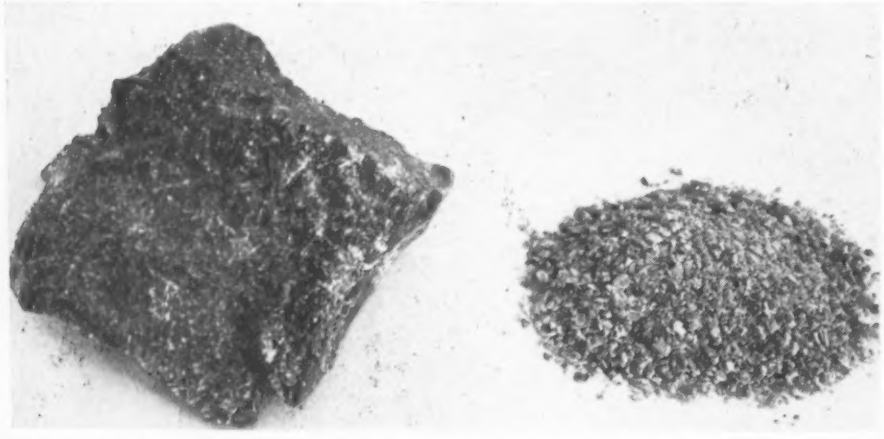
It should be emphasized that the obsidian, which forms a base material for CBM, is not perlite. In the course of their studies it was found that of the various types of volcanic glass in the western regions, only one is believed to have all of the qualities which produce a material with the desired strength and lightness. At the present time there are two known deposits of this rock in existence; both of these are at Beatty, Nev.

CBM is said to combine well with gypsums, cements, clays, asbestos, magnesia, and other ingredients to form sheet and block insulation material for homes, building walls, attics, roofs, and linings. When mixed with various adhesives, it can be employed as a thermal insulating plaster for walls and interiors or as an insulating roofing plastic. As an insulating material, it has been tested at temperatures better than 2500 deg. F. with the lowest K factor known.

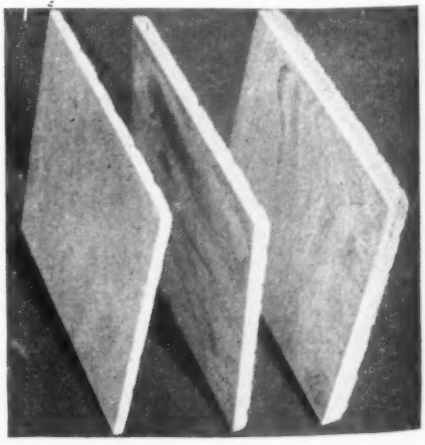


Showing comparative weight of a standard building brick balanced against three lightweight concrete brick

It is in the building construction field that the advantage of CBM's



To the left is a piece of obsidian rock as it comes from the mine, and to the right is the crushed product before it is introduced into the furnace for expansion into lightweight aggregate



Showing possibilities of the new aggregate in the manufacture of concrete tile. To the right may be seen a standard tile block, and to the left are two blocks of the lightweight aggregate tile which are thinner in section and possess ample strength

light weight and strength promise the most dramatic results. Laboratory tests have shown that when it is mixed in proper proportions with cement and other aggregates, the resulting block weighs approximately one-third as much as a standard sand and gravel concrete block and yields better than twice as much compressive strength seven days after the blocks have been poured. Compression tests show it to have strength equal to standard sand and gravel concrete, and also equal tensile and modulus of rupture strength. Furthermore, it is claimed that when mixed in the proper proportions, slabs of CBM concrete will "give" under overloads without cracking or going to pieces.

Use As A Plaster

Employed as a plaster, CBM is said to have many advantages. Because of its resiliency, the tendency to crack and fracture is reduced to a minimum. Since its weight load is approximately 50 per cent as much as standard sand plaster, savings may be realized in handling and in the speed of application. CBM-plaster may be applied to its full thickness in a single application. Because of its natural insulating characteristics and the fact that it has acoustical properties, this aggregate opens an entirely new field in plastering.

At present the new manufactured lightweight aggregate is under limited production in Chula Vista. Scheduled for delivery by early summer are 24 furnaces which will enable the plant to launch into full-scale production. The Chula Vista plant, however, will act only as a pilot plant, as other plants will be located in the strategic building centers of the nation. These will be manned by specially trained personnel who will guide the production and distribution, and will be able to answer and help solve the questions of builders and engineers. The distribution channels will be maintained through well-established and reliable building material firms familiar with construction problems and staffed by engineers familiar with this aggregate's properties.

Strict control will be maintained over the production and distribution, thus resulting in a uniform product at all times. Special mixes can be prepared to suit requirements.

To Add Concrete Specialties

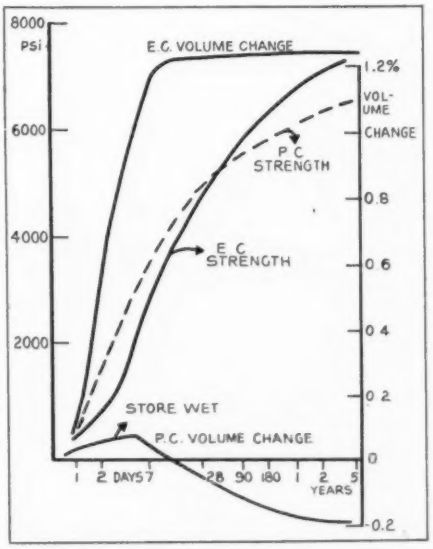
Smith Concrete Products, Inc., Kinston, N. C., began production of concrete block in June, 1946. The plant is one of the largest in the State, and includes a Besser Super Vibrapac, Erickson and Lewis-Shepard lift trucks. It was designed to permit the installation of an additional block machine. Five curing rooms are equipped with doors insulated with mineral wool and covered with asbestos. Bulk cement bins and aggregate bins will be installed, and the plant will be entirely completed by Spring of 1947. An attractive office building was constructed with units produced at the plant. Future plans include the production of precast concrete specialties. C. K. Smith is president of this company, a member of the North Carolina Concrete Masonry Association, and Milan Muzinich is plant superintendent.

Demonstrating the high insulation value of a slab of plaster in which the lightweight aggregate has been used. An acetylene torch is applied to a half-inch slab of plaster while the hand holding the plaster does not feel any appreciable heat. When struck by a hammer, the plaster does not crack but merely has a crushing action, leaving an imprint of the head

Expanding Cement

By Dr. F. O. ANDEREGG*

IN A SERIES OF ARTICLES in the French Journal, *Genie Civil*, H. Lossier has proposed a mixture of cements capable of producing a controlled expansion. Starting with a portland cement base, sulfoaluminate cement is added as expanding agent and blast furnace slag as stabilizing agent. The expansion takes about 15 days and requires moist curing for that period. The effect of the expanding agent on volume change and on strength are shown in the chart.



Curves showing a comparison of strength and volume change between portland cement and expanding cement

The benefits of an expanding cement in placing the reinforcement in tension are obvious. This is especially important with the stirrups used in beams to resist diagonal shear. With reinforcement at the bottom of the beam, the action of the expanding agent is to produce tension in the steel, compression in the concrete, and a small camber in the beam. (Such an expansion depends upon the growth of sulfoaluminate crystals, which are usually needle shaped. Such crystals have a tendency to continue to grow as the moisture content and as the temperature change. It remains to be proved whether such members exposed to the weather do not continue to expand and to a dangerous extent.

Another action occurs in contact with the weather, a slow hydrolysis of the sulfoaluminate and disappearance of the crystals. One wonders about the effect on the concrete structure of loss of expanding agent. Moreover, while expansion along the axis of the reinforcement is advantageous, what happens at right angles thereto? Poisieulle's ratio is involved. With restraint in one direction, extra growth occurs in the other directions, and experience has shown that whenever crystals grow within portland cement concrete, the integrity of the concrete is deleteriously affected. Carefully controlled experiments are in order to determine whether these limitations are serious.

*Reviewed by Dr. Anderegg, Housing Research Division, John B. Pierce Foundation.

NEW MACHINERY

Large Concrete Mixer

R. G. LeTOURNEAU, INC., Longview, Texas, has developed a 7-cu. yd. transit mixer which is capable of pouring the mixture up over the top of house forms or even at a height of over 20 ft. for other building construction. The manufacturer points out that with this machine the necessity for scaffolding, discharge or distribution chutes, or wheel barrows has been eliminated. It was designed expressly for use with the Tournalayer machine for mass production of concrete houses.

Large capacity transit mixer in elevated position for dumping

This huge mixer, called the Tournamixer, travels under its own power to the pouring site. The mixer will operate at a selectively variable speed in either direction of rotation of the drum, permitting the concrete to be thoroughly mixed while rotating in one direction, and to be forced out the discharge end, due to the corkscrew action of the blades, when rotated in the other direction. This method of control does away with the need for a discharge door.

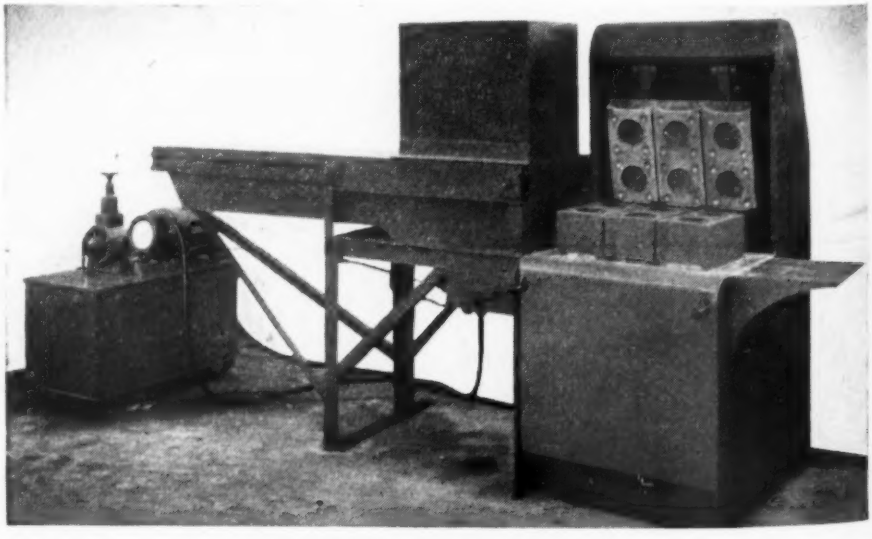
The mixer is driven directly by its power plant located at the central or rotating axis of the drum. It is driven through the medium of a splined hub which is bolted to the drum and attached to the power unit by an internal spline which causes the drum to turn one revolution with each revolution of the power unit. The power unit consists of an electric motor and built in gear box, the driving spline of the gear box being substantially in line with the rotor of motor, eliminating chains, belts, or other means to transmit the power. The power plant and drive unit move in unity with the drum. The drum is an elongated steel structure which contains integral blades, helically shaped and progressing in size proportional to the size of the drum.

Hydraulic Block Machine

WESTERN DISTRIBUTING CO., Tucson, Ariz., is marketing an hydraulically powered block machine. Known as the Vesper block machine, the only manual operations necessary are to manipulate the control valves. It is purely a pressure machine, the pressure being applied to both top and bottom of the block.

The standard machine is designed to make a 6-in. block height, but it is designed so that a special, long stroke cylinder can be installed to make 8-in. block. The 4-in. block can be made on the standard machine by the installation of "slugging" rings. Pressure on the top of the block is applied by a link toggle arrangement, and provides 1-in. pressure, not adjustable. The pressure on the bottom of the block is applied by a direct compound cylinder, and is adjustable from zero to 4-in., which is said to make it adaptable to all lightweight aggregates. The machine can be equipped with interchangeable cores to make any other block (mortar or mortarless) or combination of blocks that will fit into a 19- x 25-in. area, or it can make one large slab for roof or insulation units.

A feeding mechanism is part of the machine so that a mixer can be mounted directly above to dump into the hopper. The machine then does the rest—feeds itself, makes the block, ejects, and then an off-bearer picks up the three blocks and rolls over a monorail to drop the blocks on a rack. The off-bearer is operated separately.



Hydraulically operated block machine

Water-Proofing Masonry

TAMMS SILICA CO., Chicago, Ill., has developed a water-proofing agent called Agraseal which is designed to provide a protective sealing job on porous masonry surfaces. The material is available in white, ivory cream, light buff, natural stone grey, sunny yellow and light green. Second coats are only desirable when a stronger color value or smoother finish is desired.

It is said that Agraseal may be easily applied with an ordinary scrub brush. When first applied, material penetrates deep into open pores. When it sets, a positive seal is established which, it is claimed, withstands dampness, water, steam, alkali, sun, smoke, heat, cold frost, and ice. It is only sold through block manufacturers: It comes in powder form and mixes with water only. One gallon covers 50 sq. ft. for the first coat; 100 to 150 sq. ft. when second coat is applied.

End-Discharge Mixer

KWIK-MIX CO., Port Washington, Wis., has announced an improved 3½-S Dandie end discharge concrete mixer. Mixer can be approached from either side or from the end. An air-cooled engine eliminates freezing in winter, and heating up in summer.

Propose Ready Mix Plant

GRAVES BROS. of Melvin, Iowa, have applied for a permit to build a ready mixed concrete plant in Worthington, Minn.

Paul Kent, Builders Supply Co., Champaign, Ill., retiring vice-president, to the left, and Ernest Horne, secretary-treasurer, Wabash Valley Ready Mixed Concrete Association

New Trends In Concrete

Wabash Valley Ready Mixed Concrete producers discuss lightweight aggregate, concrete mix-design, and air-entraining cements

OVER 140 producers, manufacturers and guests were registered at the seventh annual convention of the Wabash Valley Ready-Mixed Concrete Association, held February 10-11 at the Stevens Hotel, Chicago, Ill., to consider markets, merchandising, design of concrete mixes and to conduct association business.

Officers

A. C. MODAHL, Modahl and Scott, Bloomington, Ind., was elected president, to succeed F. E. SCHOUWEILER, Fort Wayne, Ind.; C. P. O'LEARY, Terre Haute Concrete Co., Terre Haute, Ind., was elected vice-president; and ERNEST HORNE was reelected secretary-treasurer. The new Board of Directors is comprised, in addition to the officers, of the following: F. N. BUNZENDAHL, Connersville, Ind.; R. A. SCHAUB, East Chicago, Ind.; J. H. RANDOLPH, Evansville, Ind.; PAUL F. KENT, Champaign, Ill.; H. E. NELCH, Springfield, Ill.; J. F. MCCRACKEN, Louisville, Ky.; and J. W. HUNTER, Danville, Ill.

Lightweight Aggregates

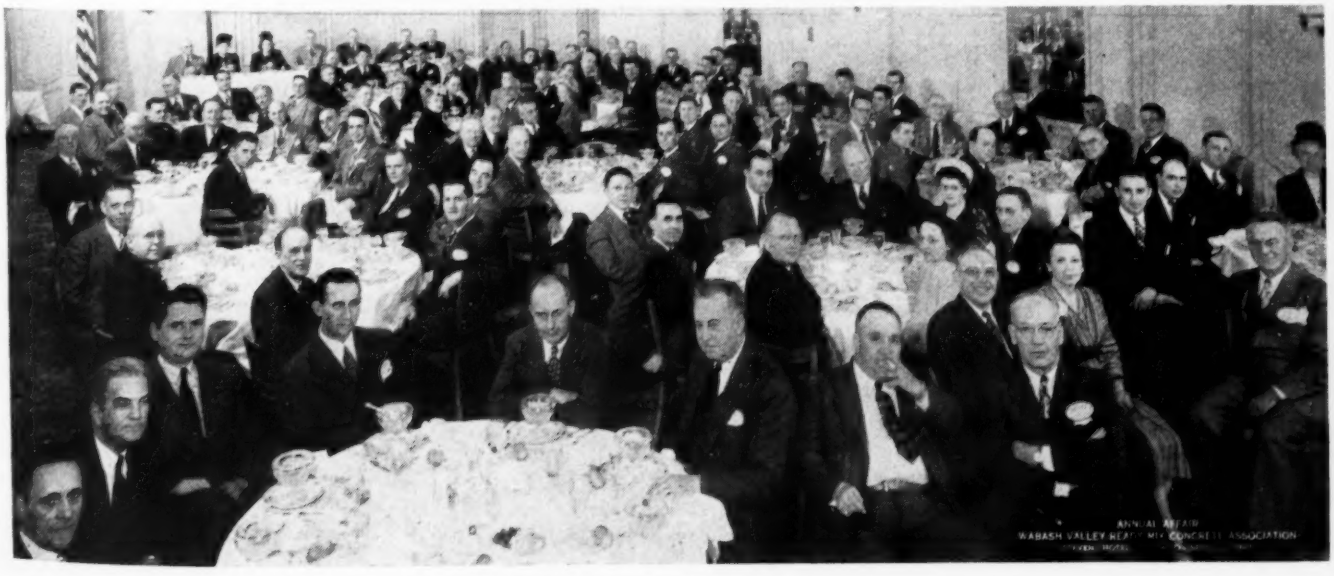
PAUL M. WOODWORTH, Director of Research and Development, Waylite Co., Chicago, Ill., presented a very interesting discussion on the subject, "Lightweight Aggregates in Ready-Mixed Concrete," as the first scheduled speaker. Mr. Woodworth not only pointed out the extent of potential markets for lightweight ready-mixed concrete but discussed at great length the differences in proportioning, mixing and handling between lightweight concrete and concrete made from heavy aggregates.

To start out, Mr. Woodworth reviewed the development of the use of lightweight aggregates in the United States, which really started on a large scale from the building of concrete ships for World War I. Lightweight slag aggregate was developed in the late 1920's. Their manufacture was briefly described. Cinders are still the most widely used lightweight aggregate, he said, in pointing out that seven million cubic yards of lightweight aggregates were required by the concrete masonry industry alone in 1946. Of the total concrete masonry units usd, 40 per cent were of the lightweight variety.

Pointing his remarks specifically to the ready-mixed concrete industry, Mr. Woodworth said that the largest immediate market for jobsite-placed lightweight concrete is for floors and roofs in building, with a potential volume for floors equivalent to one-fourth the volume of concrete for reinforced floors. The application would be a 2-in. lightweight concrete fill, for example, superimposed over conduits resting on a 6-in. structural concrete slab. The next largest outlet is for use in fireproofing structural steel frame buildings.

Lightweight concrete can, he said, be competitive with sand and gravel reinforced concrete, although he emphasized throughout his talk, uses that would supplement the large volume of heavy aggregate concrete. For example, three stories instead of two might be superimposed on an existing building in some cases, by the use of lightweight structural concrete. A future use with large volume potential is in the jobsite and for acoustical finishes the casting of large precast panels at for ceilings of structural concrete.

Turning to a consideration of the properties of lightweight concrete



Members and guests attending annual banquet

(manufactured slag aggregate), mixes and handling, Mr. Woodworth said that a greater percentage of fine aggregate in proportion to coarse sizes is used than for sand and gravel concrete, since lightweight concrete is harsh. Proportioning by weight is feasible, he said. Harshness is due to a lack of fines in the 100-mesh range, and bank sand or masons sand is sometimes added to yield a good trowel finish and to minimize bleeding. It is anticipated that lightweight slag aggregate will ultimately be manufactured to have 15 per cent to 20 per cent minus 100-mesh particles. A longer mixing time is required with lightweight aggregates, the sequence consisting of mixing the aggregate with two-thirds the required water for one minute before adding the cement, followed by one and one-half to two minutes of mixing. For a floor fill, the concrete would have 0 to 1-in. slump. Yield is 0.8 cu. yd. of concrete per cu. yd. of lightweight aggregate. Air entrainment has the effect of producing a lighter-weight concrete with less harshness.

At present, ½-in. top size lightweight slag aggregate is produced but ¾-in. top size will be available if volume of demand justifies. Coarse aggregate (slag) weighs 30 to 50 lb. per loose cu. ft., and the fine size (minus No. 4) weighs 50-70 lb. Resultant concrete weighs from two-thirds to three-quarters that of sand and gravel concrete, but compressive strengths from 2000 p.s.i. to 4000 p.s.i. may be attained. Design of mixes may be based upon the conventional water-cement ratio methods, but 40 per cent more water and some 50 per cent more portland cement are required than for sand and gravel concrete of comparable strength.

Z. G. HOPKINS, special representative of the Western Railway Executives, in commenting on railway shipping conditions for 1947, said that the railroads are now handling one-third more traffic than during World War II with 600,000 less cars. He urged that shippers and all concerned with railroad transportation work together like they did during the war in order to make the most of existing facilities during the present shortage of moving equipment. Actually, the roads had fewer cars at the end of the war than in 1943, he said, because of car deterioration that necessitated retirement at a rate exceeding the addition of new cars. Beginning in May, 1947, he said that the number of new cars to be available will exceed the retirement rate for the first time since V-J day. The box car shortage will continue through the grain movement season.

Labor Legislation

V. P. AHEARN, executive secretary, National Ready Mixed Concrete Association and National Sand and Gravel Association, in a discussion of labor legislation, particularly considered the Wage and Hour Law and the Gwynne Bill which, he said, are of more direct concern to the industry than any broad labor legislation.

In discussing the Wage and Hour Law, he said that union agreements do not supersede the law and cautioned that titles of workers do not necessarily exempt an employe from the overtime provisions of the Wage and Hour Law. To emphasize his point, he told of the case where the treasurer of a company was ruled as coming under the law, upon suit after dismissal, because more than 20 per cent of his time was spent in non-supervisory work. He urged that payrolls be studied carefully in order to determine compliance for each individual and he cautioned that some bonuses and commissions will involve a recalculation of wage rates for the purpose of determining the time and one-half rate of pay for time over 40 hr. per week under the Wage and Hour Law. Mr. Ahearn believes the law will be amended to provide for a minimum rate of pay of 65¢ per hour.

In his discussion of the Gwynne Bill, which would institute a one-year statute of limitations under the Wage and Hour Law, he said that suits for overtime provisions could be instituted back to October, 1938, when the Wage and Hour Law became effective, until a statute of limitations is enacted.

Compromises with workers are no defense now, he said, and good faith means nothing, whereas the Gwynne Bill has desirable provisions based on whether good or bad faith was exercised in cases of violation of the law.

Mr. Ahearn predicted that the closed shop, industry-wide bargaining, jurisdictional strikes and secondary boycotts will be outlawed by Congress, and that certain strikes and actions in restraint of trade will be declared illegal. An outstanding example mentioned was the prohibition of the use of ready-mixed concrete in Chicago due to union action.

Mr. Ahearn said, in order that industry members not be at a disadvantage in collective bargaining, that the National Ready Mixed Concrete Association will make an economic study of industry rates, vacation practices, etc., to be made available for guidance in drawing up contracts. He insists that the industry be in position to make its own proposals to labor rather than just take a defensive position in negotiations. In closing, he said that the industry must secure better working agreements and re-acquire its rightful authority and the loyalty of its workers.

W. D. M. ALLAN, Director of Promotion, Portland Cement Association, in his talk, "Development of Ready-Mixed Concrete Markets Through Advertising and Promotional Campaigns," covered essentially the same points stressed in his excellent presentation before the National Ready Mixed Concrete Association convention in Los Angeles, Calif., in March. His remarks at that meeting were abstracted on page 171 of the April, 1947, issue of ROCK PRODUCTS.

An open discussion following, developed that dump body truck delivery has increased in popularity during the past year, one producer stating that he made delivery up to 40 miles with such equipment.

Left to right: F. G. Finney, Ready Mix Concrete Co., Peoria, Ill.; Hazel Darnell, Acme Ready Mixed Concrete Co., Rockford, Ill.; and E. L. Dwyer, Ready Mix Concrete Co., Peoria, Ill.

Fundamental Concepts Involved in Designing A Concrete Mix

PROF. R. E. MILLS, Purdue University, in charge of Material Testing Laboratory, in his talk Friday morning reviewed some of the Fundamental Concepts Involved in Designing A Concrete Mix. In his opening re-

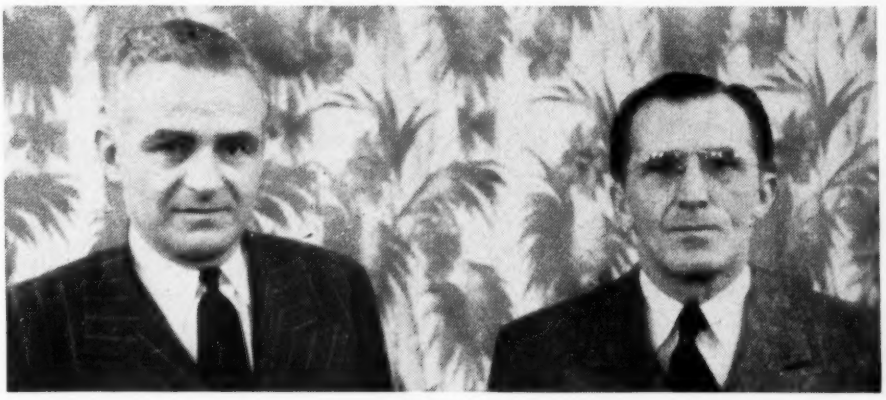
marks Prof. Mills expressed regret that it was impossible to carry out the original plan to hold the meeting at either the University of Illinois or Purdue University due to difficult hotel and housing situations in college towns.

Mr. Mills stressed the value of studying the materials which the plant uses. In reviewing the progress in making better concrete, Prof. Mills said that the early pioneers were striving for impervious concrete, such as the Fuller and Thomson experiments. He referred to the parabolic equation from which Fuller developed his maximum density curve. The next important development was Duff Abram's water-cement ratio theory and the fineness modulus. He said that the fineness modulus of aggregates had been projected by Stanton Walker and M. A. Swayze to cement. Duff Abrams also developed the relative consistency or slump test which has come into general use. L. A. Edwards in Canada has come up with a relative surface area theory. The most recent advance in concrete design is the work of Talbott and Richard of the University of Illinois, using the mortar void method, using the equation A + B + C — V = 1 or sand plus coarse aggregate plus cement minus voids equals 1.

Design of Concrete Mixes With and Without Entrained Air

Before launching into his talk, STANTON WALKER, engineering director, briefly outlined the functions of the National Concrete Masonry Association and how it helps the industry, individually and collectively. Mr. Walker said that the local and regional associations are doing an excellent job in supplementing the work of the national association. The local associations, he said, are doing a job which the national association is not set up to do.

Mr. Walker then proceeded, with the help of GLENN C. COOK of American Builders Supply Co., at the blackboard, to give a very practical demonstration of how to design a concrete mix for a specified strength. For the purpose of simplifying the calculation, Mr. Walker distributed mimeographed copies of basic data in tabulated form taken from the booklet, "Control of Quality of Ready Mixed Concrete" prepared by the National Ready Mixed Concrete Association. He took for his example a mix design calling for 3500 p.s.i. concrete with 1-in. maximum size rounded aggregate, a slump of 3 to 4 in., and 6½ gal. of water. Saturated surface dry aggregates were specified. As these or similar calculations have been published before in reports of the national meetings, they will not be repeated, but Mr. Walker said that anyone writing to the national association headquarters in Washington, D. C., will be sent copies of the Bulletins referred to in his talk.



Left to right: F. E. Schouweiler, Old Fort Supply Co., Ft. Wayne, Ind., past president, and the new president, A. C. Modahl, Modahl & Scott, Bloomington, Ind.

Turning to the problem of air-entrained concrete, Mr. Walker said that the concrete should be designed on an air-free basis and then make the necessary adjustments of water to cement and sand. He cautioned that care must be exercised or strength will be lost very markedly. Glenn Cook also worked out on the blackboard a mix problem with air-entrained concrete. Mr. Walker pointed out that there is roughly a 4 per cent reduction in strength for each 1 per cent of air entrained. Assuming a mix with 42 per cent fine aggregate, 4 per cent air entrained saves as much as 8 gals of water per cu. yd. With a lean mix, 65 per cent of the water can be taken out. Mr. Walker said that many of the early troubles experienced with air-entraining cement have been overcome by the manufacturers of present-day air-entrained cement. He said that it is still necessary to keep a close check on the mixing of air-entrained concrete, and then demonstrated the use of two test machines for determining the percentage of air entrained. Several of these testing machines are now available. In addition to Geo. Heck in Minneapolis, Minn., the Acme Air Meter Co., Springfield, Ill., and Central Scientific Co., Chicago, Ill., also are making these testing machines. Mr. Walker commented on the use of air-entraining cement versus introduction of the air-entraining agent in the plant. There is some advantage in introducing the agent in the plant, but on the other hand cements vary in the amount of air that will be entrained using the same amount of agent. Replying to the question as to why there is an increase in air in air-entrained concrete during cold weather, he pointed out that water is more "viscous" in cold weather.

The concluding session was devoted to a discussion of equipment and general association business. E. O. MARTINSON, C. S. Johnson Co., Champaign, Ill., led the discussion on trends in equipment. He indicated that there is a trend toward central plant mixing because of the advantages to be attained in control of quality. He traced developments in weighing equipment and practice, and recommended large ground storage capacity for aggregates probably with a tunnel reclaiming setup and the use of equipment such as radial stackers, in order to attain flexibility of operation.

He discussed the pros and cons of various types of material handling equipment and said that there is a decided trend to the use of automatic equipment for handling aggregates. Close tolerances on total weight of aggregate are desired and, in large plant layouts, are desirable for each aggregate. The trend is toward more accurate means of control through checks, such as recording charts, on personnel. Mr. Martinson concluded with a discussion of relative costs including amortization, between small and large plants with the latest features, to emphasize that the rate of amortization in a large plant layout is low relative to the economies of operation and other advantages to be attained.

Nailable Floor System

LOUIS GELBMAN, New York, N. Y., well-known inventor and vice-president of Concrete Units Corporation, has announced that Stearns Manufacturing Co. will handle his nailable floor system. Mr. Gelbman has perfected a floor system using an inverted T-member with a wooden nailing strip on the leg of the T. This wood strip makes it possible to nail wooden floors directly to the concrete joist. The flange section of the joist forms the ceiling of the floor below. Through the use of a novel design of gang molds it is possible to cast the T-member of this floor system without disturbing the molds, which is said to assure perfect alignment of all finished casts. The Stearns company will fabricate the molds.

BREA READY-MIX CO., Brea, Calif., has been established by Dick Jones and Jack Perrin to prepare and sell ready mixed concrete.

Part of a train of tractor-semi-trailer units hauling concrete pipe from United Concrete Pipe Corporation plant to San Diego, Calif., aqueduct job. Pipe sections are 16 ft. long

Big Pipe Contract

UNITED CONCRETE PIPE CORPORATION, Los Angeles, Calif., is supplying 180,000 tons of concrete pipe for the City of San Diego aqueduct between San Jacinto and San Diego. This large pipe is handled with a fleet of 200 Fruehauf semi-trailers. Pipe sections are 16 ft. long, diameters are 48, 54 and 72 in., with weights ranging from 9 to 17 tons.

Export Block Equipment

HOLLOSTONE COMPANY, INC., North Hollywood, Calif., producer and manufacturer of concrete block manufacturing equipment, announced the recent sale of four new plants to four different foreign countries, the latest coming from Holland. Apparently there is a large foreign market for block machinery.

California Pipe Meeting

A THREE-DAY MEETING of the California Associated Concrete Pipe Manufacturers at Fresno, Calif., drew an attendance of 50 members and 29 affiliates and guests. The Board of Directors at a meeting on the first day reelected the following officers: H. W. Chutter, president; Fred N. Linn, vice-president; and Hugh Pollard, secretary-treasurer. The following directors were reelected for a three-year term: L. L. Dobkins, Fewell Concrete Pipe Co., Garden Grove; Hugh Pollard, Pollard Bros., Ltd., Fresno; Francis Porter, Lindsay Cement Products Co., Lindsay; and L. S. Stroud, Stroud-Seabrook, Bakersfield.

Two business sessions were held on Thursday and Friday, March 20 and 21, covering matters of general interest to the pipe industry. A decision was reached to purchase from association funds a complete set of hydrostatic testing equipment covering diameters 6-in. to 24-in., inclusive, for use by assocation members and purchasers in California. Plans for the employment of a field engineer were discussed and arrangements are now being made for the employment of an engineer at an early date. Over $5000 was allocated for advertising in Western trade and farm journals. Considerable discussion centered on Bureau of Reclamation jobs proposed in the West, and specifications for the type of pipe to be used thereon.

At the Thursday morning session, the recent deaths of W. T. Liston of Harlingen, Texas, and Cash M. Davis of Dinuba, Calif., was announced.

The Fall meeting of the California Associated Concrete Pipe Manufacturers will be held in Bakersfield, October 24 to 25.

Invite Machinery Manufacturers To Tell About New Products

Concrete Masonry Manufacturers of Southern California have technical session covering machinery developments and aggregates

AN EXCELLENT ATTENDANCE was recorded at the second annual meeting of the Concrete Masonry Manufacturers Association of Southern California held at the Elk's Temple, Los Angeles, on March 28. All seats were taken at the luncheon, and at the dinner the hall was crowded to overflowing. We were particularly impressed with the manner of conducting the more or less technical sessions, especially that part wherein manufacturers of equipment, sellers of admixtures or special aggregates such as pumice and artificial lightweight aggregates, all were called to the microphone at the speaker's desk and got a chance to tell about their company and the advantages of their product. "It was a field day for the machinery peddlers" as one member put it.

New Machinery

The session started about noon and ended a little before midnight. After a brief address of welcome by President E. P. Ripley, the panel discussion on machinery, admixtures, aggregates, etc., started. At this point, Mr. Ripley turned the meeting over to J. A. Allen of the Hollostone Co., Inc., who acted as moderator during the early afternoon session. D. HUBERT, sales manager for Besser Mfg. Co., was one of the first called. He told of the capacities of the Besser Super-Vibrapacs (4800 blocks 8- x 8- x 16-in. or equivalent per 8 hours), and said there were now 63 Besser machines in California and Arizona. The policy of his company, he said, was to try and keep each Besser plant at least 10 miles apart so there would not be too much of a conflict from a competitive standpoint.

Following Mr. Hubert of Besser Mfg. Co., BERNARD FLAM told of his new company called Flam Concrete Industries, Van Nuys, Calif. He stated that his company would specialize in mechanical problems relating to the industry, and the designing of automatic machines for such special shapes as roofing slabs, fence posts, etc.; also to assist those who have Flam block machines of the hand type to adapt them to hydraulic presses for ejection of the block, or to make other alterations that would improve the mechanical features.

J. WILLIAMS of the Williams Engineering Co., Los Angeles, mentioned his company's efforts to improve the life of mixer arms and mixer drums. At one job, he said, near Indio, Calif., mild steel liners lasted only 90 days because of the garnetic pea gravel used. His company installed Armourite of the B. F. Goodrich Co., and the liners lasted over a year. He also spoke of special Hi-nickle steel and also rubber liners, and of special dust seals on the shafts to protect bearings. His company has done considerable work on the design of paddles and found that 38 deg. tipping was the best; that the 35 deg. angle threw the mix too much, resulting in the problem of liners vs. paddle wear. He maintained on the spiral type of mixer that the throw was from end-to-center and hence gave excessive wear in the center of the mixer. His company also manufactures hydraulic skips, loaders, and hoists.

MR. O'ROURKE of the B. and W. Brick and Materials Co., Chicago, Ill., distributors of the Western Sales & Mfg. Co., Seattle, Wash., told the group about his company's Hi-speed air block manufacturing machines. The "Single" has a capacity of 200 blocks per hour and the "Double" 375 per hour, he said. The "Super," under development, will be on the market soon, and will have a higher capacity. All capacities are based on an 8- x 8- x 16-in. block. He said the machine combined vibration with compression with control through a patented hand valve. He described briefly his company's new concrete brick machine that had a capacity of 6000 brick per hour. This plant would require a heat tunnel 50 to 80 ft. long, and have a continuous mixer and power take-off units. The Seattle plant has been producing 41,000 to 58,000 brick per day. The company also manufactures conveyors and mixers for the block trade. In operation in the San Francisco area, there are 16 machines in service.

J. A. ALLEN of the Hollostone Co., Inc., North Hollywood, Calif., spoke briefly about his company's success in selling machines in foreign markets and of having just recently sent a machine to Holland.

Lightweight Aggregates

FRANK STEIGERWALT, representing the Stearns Mfg. Co., Inc., Adrian, Mich., told about the Stearns Joltcrete machines, the No. 7 and No. 9, and of the 12- to 50-cu. ft. mixers. He mentioned the new No. 15 machine that will have a capacity of fifteen 8- x 8- x 16-in. block per minute. It will have mechanical vibration below and magnetic vibration above coupled with a compressive action. He also spoke of the development of lightweight aggregates from fly-ash. This is a coal ash still containing some unburned coal which, when mixed with some clay, can be burned to a very satisfactory lightweight aggregate which they have called Sinterlite.

The speaker also mentioned a new plastic material for facing cured concrete units called Dianaglass which his company would announce soon.

Those present who had aggregates for sale were either pumice producers or special lightweight aggregate manufacturers. There was no one present to represent the sand and gravel aggregate producers. Pumice producers who described their products were: Bennett and Dole, Long Beach, Calif., with plant at Olancha in the Owen's Valley district. Mr. Dole said his company produced graded pumice ⅜-in. to 1¼-in. size with pumice sand in the minus 10-mesh range.

MR. TOWNE of the California Pumice Co., said his new company had an unlimited supply of material. Mr. Miller of Insulpum Co., Los Angeles, Calif., spoke of the importance of control in the concrete block industry. His company has a pumice plant in Kern County, Calif.

P. R. SPLANE of P. R. Splane and Co., pumice producers, Los Angeles, described operations at Coso Hot Springs, south of the Owen's valley pumice producing district. Two types

of pumice aggregate are produced: one high in fines and one low in fines for the stripper-type machines. His company has been shipping pumice from its mine to the Bay area around San Francisco and as far south as the Mexican Border. He said there were an infinite number of pumice deposits in Calif., some of questionable worth, and that block manufacturers should buy from established and well known producers.

EASTMAN M. MARKELL, vice-president of the Air-ox Co., Los Angeles, said his company's plant was at Casmalia, Calif., in the Santa Barbara area. The lightweight synthetic aggregate made by his company was first prepared for and sponsored by the Maritime Commission for ship building purposes during World War II. His earlier product had a Sp. Gr. of slightly over 1.0 and showed very high strengths in the 5000-lb. range, but was relatively high priced. His company was about to market a new aggregate with a much lower price, using an oil impregnated diatomaceous earth. It is first calcined and the oil therein brings about a cellular structure. Then this expanded material is atomized with an exterior clay-like coating and again burned, giving a strong, coated, synthetic aggregate. This product will weigh about 88 lb. per cu. ft., and with a standard mix give strengths in the 3200- to 4000-lb. range.

Waterproofing Agents

MR. MUNCH of the Armourcoat Co., with plant at Glendale, Calif., described his company's waterproofing material that is usually applied to the inside and outside of the wall. The product is about 20 years old, he said.

MR. HOWELL, representing the Aquella Waterproofing Co., and the Southern California and Arizona distributors, the Blue Diamond Materials Co., Los Angeles, spoke of the excellence of this product, and called attention to the article published in the *Reader's Digest* about 1932 describing this waterproofing material and its use on the Maginot Line in France.

MR. ORR of the Concure Process Co., Los Angeles, told about his company's waterproofing material for concrete masonry. He said it was hard, tough, durable and impervious to moisture and that his product put a thin concrete film over the treated areas. He called attention to the fact that over 200 theater and hospital buildings in the Los Angeles area had been waterproofed with this material. The product is distributed through the concrete products industry, and is now available in a wide selection of colors, he said.

Publicity-Public Relations

PAUL MASON HOWARD, Shore-Reyes, publicity and public relations promotion, Hollywood, Calif., proposed that his firm do an over-all publicity, pub-

(Continued on page 140)

More evidence of how the NATION turns to

AQUELLA

to make Wet Walls and Cellars DRY

These actual photographs of completed jobs are but a few examples of the Aquella applications now being made in every part of the country—on every type of porous masonry structure. Never in the waterproofing industry has there been anything like this acceptance by architects, engineers, waterproofing contractors, builders and home-owners.

The explanation is simple. Aquella works—and the principle on which it works is entirely new. The inorganic ingredients are so *finely ground* that, when mixed with water and scrubbed into the masonry surface, they penetrate the minutest pores, then *expand* to form a seal that *continues to harden with age*. Even the presence of a hydrostatic head of 500 lbs. per sq. ft. on the *unprotected side* has no effect on the integrity of the Aquellized surface. Aquella leaves a brilliant white, beautiful finish, which may be painted over. Also comes in soft shades: buff, rose, green and gray.

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Basement...Vancouver, Wash.

Funeral Home...Bayside, N.Y.

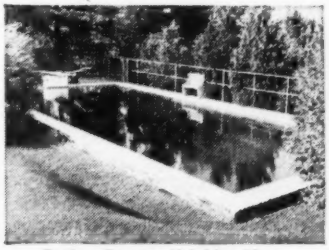
Residence...Buffalo, N.Y.

Farm Home...Smith Station, Ala.

Basement...Parsons, Kansas

Living Room...Ft. Lauderdale, Fla.

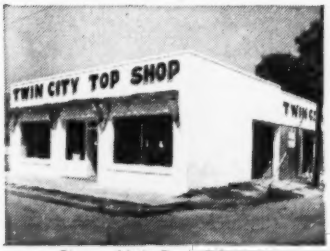
Apartment House...Norfolk, Va.



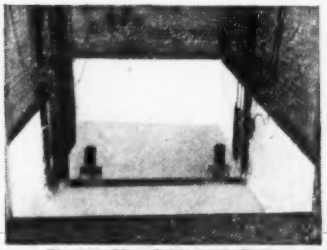
Pool on Estate...Uxbridge, Mass.

Church...Memphis, Tenn.

Belgian Tourist Ct....Hwy. US40, Balt., Md.



Shop...Little Rock, Arkansas



Elevator Pit...Bridgeport, Conn.

Animal Hospital...Lansing, Mich.

Small Plant...Coral Gables, Fla.

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California Meeting

(Continued from page 138)

lic relations, promotion, exploitation, and merchandising campaign for the association for the purpose of increasing the sale of concrete masonry in Southern Calif. He maintained that the Los Angeles metropolitan area will soon number 8,000,000 people, and that statistics show that of the large amount of building necessary to take care of this population, only some 2 per cent will be constructed with concrete block. He proposed a comprehensive program using newspapers, magazines, radio, newsreels, and regional media, and such a program will evolve quicker and more lasting results because he felt that editorial copy is more effective than paid advertising. In using the terms herein mentioned, Mr. Howard pointed out that these elements, unlike advertising, deal not in paid advertising space but in free space in newspapers, magazines, radio, etc., that are obtainable through such companies as his. Mr. Howard's talk was well received by the members of the association as many members took the floor to affirm the need of such a campaign. When Mr. Howard was asked what such a plan would cost, he suggested several methods by which the plan could be financed such as payments being based on the increase in sales of concrete masonry or based on the increase in the building permits for concrete masonry houses. However, at the outset, the speaker said, that an initial fee of around $500 per week would be in line with the good he felt his company could do the industry.

JOHN G. RAYLEY, manager of the Southern California office of the "Plan Book," a most excellent home planning book, called attention to the Concrete Products section and to the promotional work the publication was doing to extend the use of concrete masonry by showing some fifteen home plans wherein concrete masonry is specified.

AMOS C. CLARK, Baldwin Hills Material Co., told about the use of Darex, mentioned that this admixture cuts water 10 per cent, lowers absorption, and makes a smoother and better appearing block. His company is distributor for Darex in Southern Calif.

MR. RICE of the Bubblestone Co., Santa Monica, Calif., described his material as a true air-entrained concrete that resulted in a lightweight product. He said Bubblestone added 3 to 5 per cent of air by volume to the concrete, increased the lubrication and workability of the concrete. In the discussions that followed these two admixtures (Darex and Bubblestone), it was brought out that there was a need for more definite technical information on just what admixtures do to concrete and that laboratory tests should be available to manufacturers as most masonry plants have too many variables to make the plant tests of much value.

Building Codes

At the conclusion of the panel discussion on machines, admixtures and aggregates, A. MACINTOSH, engineer, spoke on the subject of "Building Codes and How They Affect the Block Industry." This was a very important subject and the speaker stressed the need of the block manufacturer to watch attempts to change the building codes in his area; to work with and get acquainted with the members of the local city councils and to educate them on the advantages of concrete masonry. He said laws and structural codes could be too lax so that poor materials would enter the markets and that such poor material would eventually reflect on the industry, or, the codes could be so written as to preclude the use of concrete masonry altogether.

At the conclusion of this paper the meeting adjourned for a brief recess and cocktail hour before reconvening in Parlor A for the dinner and evening discussions.

Mix Proportions

After dinner the panel discussion on mix proportions and light and heavy aggregates was taken up with President E. P. Ripley acting as moderator. C. WAILES of Wailes-Bageman told about his company's experience with pumice, using a minus ⅜-in. material as a one-graded size. He mentioned that sizing and re-combining had advantages. With pumice bricks,

1000-lb. tests were obtained with absorption running from 5 to 15 per cent; more sand lowered the absorption.

Mr. Ripley said that in spite of all the discussions on pumice at this meeting, the sand and gravel block was the leading seller in his area. He spoke of his experience with blocks where the bricklayers wanted to end-break and that more fines permitted better end-breaking; washed sands were no good for end-break. His mix was 1:7.6 or 1100 sand, 625 pea, 225 portland cement, and 15 gal. water. This mix gave 2400-lb. strength on an 8-in. block.

The value of pre-wetting pumice arose and it appeared that this improved pumice concrete. Pre-wetting in the stockpile could be practiced to a limited degree and would be helpful. Some advocated putting the pumice and water in the mixer first and allowing it to mix before adding the cement. Stephen Flam spoke of a plant he operated in the Bishop area where he made 2,000,000 brick for the U. S. Indian Service. He used 3 per cent sand and employed two mixers, one on top of the other, and produced brick that had 1200-lb. strength and 9½ lbs. absorption. The use of two mixers, one for pre-wetting, was an interesting development.

When Mr. Ripley called on manufacturers to reveal their mix proportions the following mixes were stated: (A) 1-cement, 4 pea gravel, 5 sand, 2 oz. Darex, ⅓-lb. calcium chloride; (B) 1:7 (sand and gravel) or 1½ sacks cement, 3 cu. ft. pea gravel and 6 cu. ft. plaster sand. This same manufacturer said he used the new admixture, Plastilube prepared by Union Oil Co., and got excellent workability and very low absorption (5.99 lbs. per cu. ft.). The mentioning of Plastilube brought up several discussions on the merits of this new waterproofing compound. One man stated that he made an absolutely waterproof brick using it, but recommended using lesser amounts than that which he had used for the extreme case as some absorption was desirable. All agreed that it gave better workability and a better appearing block as well as good waterproofing.

The discussions then went over to the paddle vs. rotary drum type of mixers. JIM WILLIAMS of Williams Engineering Co., thought drum mixers were more apt to ball up and used more cement than the paddle type. Mr. Ripley said a well graded material was needed for pumice and for hard aggregates he did not recommend paddles as it made cleaning of the mixer difficult. JACK ALLEN of Hollostone Co., Inc., said his experience was just the reverse; i.e., drum mixers harder to clean. Mr. O'Rourke of Western Sales and Mfg. Co. preferred the paddle type of mixer made by his company as the arms were removable, and that they used a square shaft so the arms could be locked more securely to the shaft.

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MR. ANTONANI was asked to describe his mixer and cleaning and he maintained that the Besser mixer was best and that he cleaned it out by having a 2-in. outlet and valve welded to the bottom. To clean he merely filled it with water, ran the mixer a little and then by means of a hose, emptied the excess water into the yard.

E. W. DIENHART, president of the National Concrete Masonry Association, Chicago, reviewed the history of concrete masonry in Southern Calif. Ten years ago, he said, concrete masonry in this section was in ill repute, partially due to the Long Beach earthquake, but today it was an established industry of large size and in excellent standing with the builders. He outlined the growth of the industry for the nation as a whole and said that concrete masonry sales were ahead of the clay brick when sizes of units are compared. He advised the producers against installation of equipment and then overlooking the sales end. He advocated an apprentice program to train youngsters in the art of masonry laying. He also indicated that in the East, lightweight aggregates were becoming scarcer and that portland cement might be scarce later on.

EARL MCGARY stressed the advantages of belonging to the local association and pointed out that the savings on industrial insurance alone more than paid the association dues. He said that when the industrial risk was spread over a large group the catastrophe-hazard was likewise spread over a large group and resulted in very decreased insurance costs. Mr. Ripley urged members to bring this fact to other manufacturers of concrete masonry so they could have a larger and stronger organization.

Block Testing Program

The local association recently started a test program. A certain number of blocks are taken from a member's stock pile once every three months, and are tested by Triplett & Barton, Burbank, Calif. ALVIN A. REITMAN of that company told about the results of these tests thus far. The testing program has been in effect three quarters of the year and on the blocks tested during the first quarter 62.5 per cent passed and 37.5 per cent failed to pass the 1000 lb. specification for Los Angeles districts. On the blocks tested the second quarter 92.5 per cent passed and 7.5 per cent failed, and on the third and last quarter 96.5 per cent passed and 3.5 per cent failed, thus showing the improvement of concrete masonry due to this testing program. Mr. Reitman showed charts that brought out more in detail the results of the first and second quarterly testing. On 29 customers blocks tested for absorption there was only one failure.

WM. RICHARD LATTA, Los Angeles, also spoke on the advantages of having a company such as his handle the

subject of publicity and public relations for the association.

Cement Availability

On the subject of "Future of Cement Availability," SAMUEL HOBBS of the Portland Cement Association was unable to attend on account of illness so RAY COOLEY of the Portland Cement Association gave the talk. He indicated that there was apt to be a shortage of cement in this area during the coming year and if block manufacturers could stock pile some cement it was advisable.

LEE BEELER, of the Adobe Engineering Co., Downey, Calif., revealed his findings relating to prices, cost accounting, etc. In his resume of prices he indicated that in the Los Angeles area, sand and gravel blocks were selling for $60 to $70 per thousand for the 4- x 8- x 12-in. sizes, and in Long Beach the price for this size was $65 per thousand with $56 to $65 for the 4- x 6- x 12-in. size. Pumice blocks were selling per thousand as follows: 4- x 6- x 12-in., $90; 4- x 8- x 12-in., $116; and 4- x 8- x 16-in., $140. He estimated that it cost $1.60 per ton to load and unload concrete masonry units from trucks.

The Executive Secretary of the local association, Ed Sills, then briefly outlined the advantages of belonging to the association.

New Officers

Before the meeting concluded the following officers were elected: J. A. Allen, Hollostone Co., Inc., president, North Hollywood; Dave Shepersky, vice-president, San Diego; and J. H. Kennington, secretary-treasurer, California Brick and Tile Co., Pasadena.

Directors elected were: Charles Wailes, Ed Ripley, J. Garber, Lee Beeler, Mr. Cadey and Mr. Jaqua.

Concrete Products Plants

R-K CEMENT BLOCK CO., Saginaw, Mich., has started manufacturing concrete block at the rate of 4500 block per day. Edmar E. Roth is president of the concern.

DELMAR WEHMEYER AND HOWARD STEFFEN, war veterans, have purchased equipment and plant site in Chamois, Mo., and are erecting a con-

crete building block plant that will have a capacity of 500 block per day.

EDGELL BROTHERS, Goodland, Kans., are producing concrete block at the rate of 1000 block per day.

DWIGHT D. STONER, war veteran, Milton, Penn., has started building a Quonset-type concrete block plant that will produce 2000 block per day. He will be assisted by John Webb of Williamsport.

PRICE-THELEN CONSTRUCTION CO., Canton, Ohio, has filed articles of incorporation for the manufacture of concrete block, listing 250 shares of common stock, no par value. Incorporators are Joseph C. Thelen, Jr., Robert L. Thelen and Thomas D. Price. Joseph Thelen is the agent and Harry W. Schmuck is the attorney.

FLEMING CONCRETE BLOCK CO., INC., Cleveland, Ohio, has been incorporated by Raymond J. Fleming with a capital of 200 shares, no par value.

SHEBOYGAN BLOCK & TILE CO., Sheboygan, Wis., has increased its stock from 1000 shares, par value $1, to 2500 shares, par value $1.

CRESWELL CONCRETE PRODUCTS CO., Cedarville, Ohio, has acquired a new 3½-acre tract of land for its concrete products plant. Manufacturers of burial vaults and colored stepping stones, the firm is also manufacturing prefabricated concrete houses, complete with heating system.

BELLE PLAINE CONCRETE BLOCK CO., Belle Plaine, Iowa, has started manufacturing concrete block. Earl Hill and Gerald Ware, returned veterans, are the owners.

SELFRIDGE CEMENT BLOCK MFG. CO., Selfridge, N. D., is the name of a new concrete block plant owned and operated by Frohlich Bros., and Mike Frohlich.

CARL MCHENRY, Delphos, Kans., has purchased a concrete block plant from Ted Brott of the Southern States Material Co., Denver, Colo., that has a capacity of 2500 block per day.

D & S CONCRETE CO., Marathon, Wis., has started the manufacture of concrete building block. Capacity of the plant is 250 block per hour. Harvey Drengler and Merlin J. Sonnentag are the owners.

New Markets

(Continued from page 123)

boiler that also serves the aggregate bins as well as the steam curing rooms for the block plant.

F. W. Hedberg is president and general manager of this company, and Charles M. Freidheim is secretary-treasurer. In addition to operating this new plant, another concrete masonry unit plant located on the same property is now in full production after a general reconditioning. Hedberg-Freidheim also operates two sand and gravel plants, one on this property and another about two miles distant.

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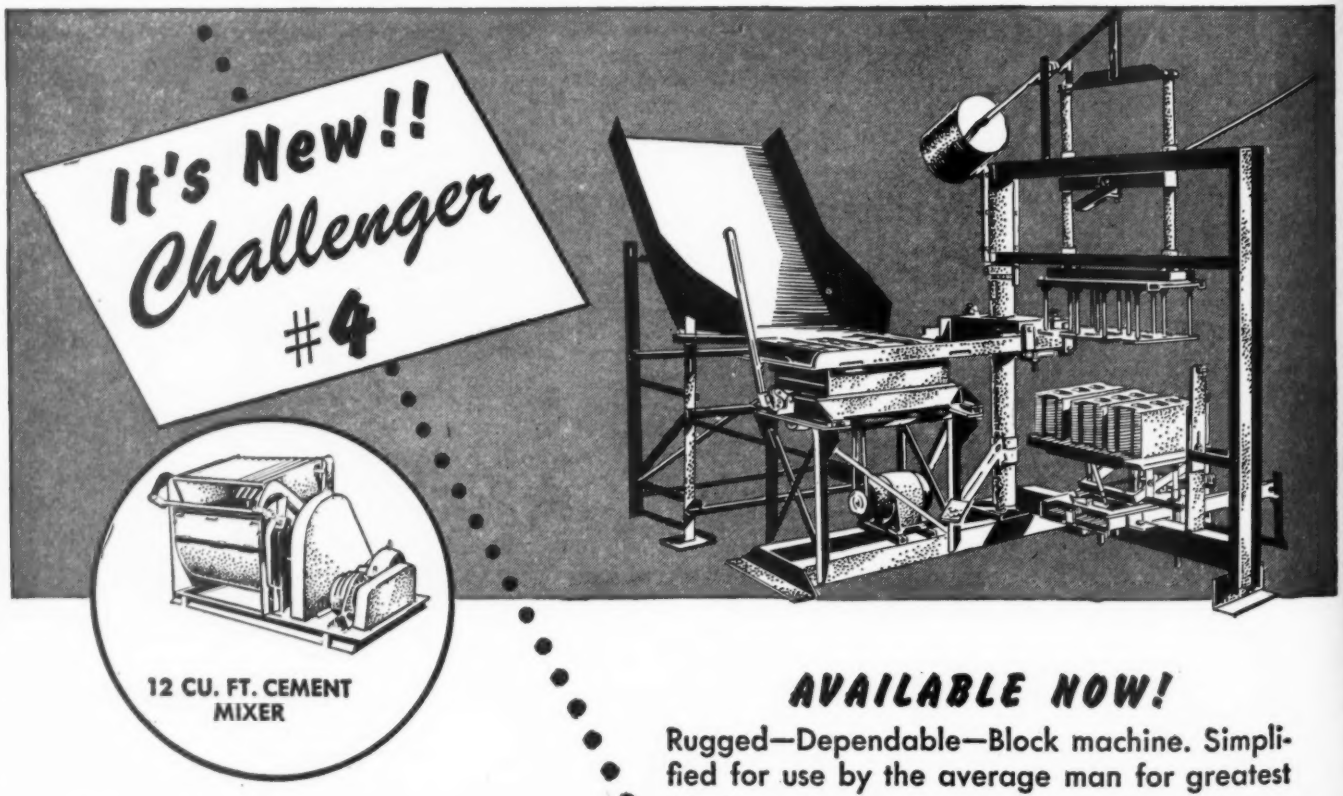

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